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ABSTRACT

The curriculum, designed for use with gifted students at the junior high level, presents units of instruction which emphasize the higher level thinking skills of analysis, synthesis, and evaluation. An introductory section explains each of the three higher level skills and presents tasks illustrating each one. Four units are presented, complete with a list of objectives and learning activities: an English unit on characterization (character description, credibility, contrasts, and actions); a math unit on real numbers (binary operations, fields, abstract systems); a science unit on heat (uses, types, and definition of heat); and a social studies unit on government (state, local, county, and town government). (CL)

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# HIGHER LEVEL THINKING

# in the

# JUNIOR HIGH

A description of activities using
analysis, synthesis, and evaluation
in a small group instructional format.

by

Hilarie Davis

with

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## Higher Level Thinking in the Junior High

This book was prepared to meet the particular needs of the Junior High school teacher and student. Unlike the Elementary and High Schools, the Junior High has the unique responsibility for extensive instruction in content during a most difficult period of social development. The activities described here are designed to teach content using a higher cognitive level approach in a format Junior High School students can operate within.

Gifted students in the seventh, eighth, and ninth grades have the ability to think abstractly about content, and to manipulate information in multiple step processes. If given the opportunity, they can create quality products based on a thorough analysis of existing products. They can use previously mastered skills of classification, fantasizing, and communication to operate on newly acquired information.

In order to capitalize on the knowledge and expertise of the classroom teacher in as many situations as possible, the higher thinking skills are defined in detail, general directions and examples of their use are given, and content ideas are suggested. Specific units of study using these techniques in each of the four content areas are also provided:

English: "What a Char-acter!": A Unit on Characterization
Math: "The Real Thing": A Unit on Real Numbers
Science: "Hot Stuff": A Unit on Heat
Social Studies: "Ask not what you can do for your country..." A Unit on State and Local Government and Civic Responsibilities.

The activities suggested in the units do not elaborate on specific techniques because it is assumed the reader will have studied the section on Higher Level Thinking Activities.

The authors would appreciate receiving copies of activities developed on the basis of these materials.

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## Higher Level Thinking Skills

I. Analysis - The process separating a system into its elements, classes, relations and order.
   - A. Analysis of Elements - The process of identification of the elements that constitute a whole.
   - B. Grouping of Elements - The process of combining elements into classes based on similar characteristics.
   - C. Analysis of Relationships - The process of associating classes or elements in a logical or natural way.
   - D. Ordering/Systematizing - The process of orgainzing the relationship to structure the system.

II. Synthesis - The process of relating multiple elements into a single whole.
   - A. Hypothesizing - The process of reaching a likely conclusion which accounts for two or more pieces of information within a total picture.
   - B. Argumentation - The process of supporting a hypothesis with a set of statements containing facts.
   - C. Summarizing - The process of developing a product that condenses divergent elements.
   - D. Fluency/Flexibility/Originality - The process of relating previously unrelated ideas, events or pieces of information in a unique and useful product.

III. Evaluation - The process of judging the value or appropriateness from an objective or subjective viewpoint.
   - A. Subjective - The process of making judgements based on personal criteria.
   - B. Objective - The process of making judgements based on impersonal, verifiable criteria.

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## ANALYSIS

Definition: Separating a system into its elements, classes, relations and order.

General Directions: The eventual product of analysis is a model of a whole system which integrates the elements, relations, and order of that system. In order to accomplish this task students need to do preliminary analyses of the elements, the relationships among them, and the order of elements and relations. Skill activity sheets analysis of elements, grouping, relationships, and classification are for these preliminary analysis. Initially, these activities will each be concluded with the small groups comparing their lists of elements. As students become more proficient in the analysis process, this small group sharing should be eliminated except for the final product. Differences in final products may then be traced to one or more of the preliminary analyses of the data. Optional activities appear in parenthesis.

In analysis activities, students are attempting to identify the necessary and sufficient elements of an established system and organize them in some way. This analytical thinking is prerequiste to creative thought, which attempts to go beyond known systems. First, the students must have the tools to operate within known systems (and be able to deduce their organization analysis), and then they can begin to improve upon these systems and combine them to create new systems.

Content Ideas:

Science - Thunderstorms, flowers, periodic table, heat

Social Studies - Winning/Losing (elections, battles), Government (School, Local, State Federal, Other Nations)

English - Story, Sentence, Personality of Character, Grammar

Math - Plane Figures, Solid Figures, Number Systems, Irregular Shapes (area)

Creative Content Ideas:

Science - Energy (alternative ideas), Powers of a Flower (photosynthesis, Pollination), Periodic Table (personality), Amoeba (alternative uses such as light, food, etc.)

Social Studies - Psychology of Westward Expansion, Invisible Aspects of Government, Minds of Leaders (explorers, presidents)

English - Author's style, characters represented by various parts of speech, a story's personality

Math - A number system without zero, various geometries; elliptical, sperical, etc.



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## ANALYSIS

### Elements

Definition: The process of identification of the elements that constitute a whole.

General Directions:

1. Choose a system (topic, something that can be considered a whole with parts) from the current unit of study.
2. For this activity you will need some 3 x 5" cards or something comparable.
3. Divide the class into teams. Each team should list as many of the elements that comprise the whole as possible; each element on a separate card.
4. Compare and improve on listings as a total class. This is an optional step and may be done in the initial uses of this activity and abandoned later.

Example: People in a school building (system)

Listing the elements that comprise the whole for this model.

Each team may list some/most of the following:

| | | |
|---|---|---|
| Principal | Vice Principal | Guidance Counselor |
| Seventh Graders | Eight Graders | Secretaries |
| Office Helpers | Psychologist | Maintenance |
| Custodian | Librarian | Aides (paid) |
| Content Specialists | Teachers | Volunteers |
| Coaches | Cafeteria Staff | Nurse |
| School Doctor | Luchroom Monitors | Audio-Visual Coord. |

(Bring the small groups together and combine lists)

Alternative ways to obtain lists of elements:

Interview - Each student interviews at least two people with different roles in the school.

Observation - Students observe by sight or sound alone in the building to build a list of who works there.

Research - Where would you find a list of people in a school? Check with the librarian.

Simulation - If I wanted to start a school, what kind of people would I need to run it.

Given lists - Give students unnamed, partial, or mixed up elements and ask them to identify the system. (e.g. the principal's name, the guidance counselor's name).

Multiple Methods - Assign each team one of the methods described above to come up with their list.

## ANALYSIS

### Elements, Activity

Purpose: Students often do not recognize the parts of a system, and the importance of each of these parts. To teach the specific elements of a system and to develop the skill of recognizing parts of a whole.

Definition: Identify the elements of a system which are necessary and sufficient to recognize that system.

General Directions:

1. Choose an object which represents a system in your current unit of study for the students to analyze. The purpose of this activity is to get the students to break a whole into its parts using several different techniques. It is important, therefore, that you choose an object that has parts that you want the students to focus on, i.e. they are important concepts to master.

2. Name and describe the object (without showing it to them) and answers "yes, no-type" questions about it for the class. Ask them to describe or draw the object (whichever they are more comfortable with).

3. After each student has completed a drawing of the object, show them the object. Discuss the conventional way of drawing the object that involves looking at the object, then at the paper, then drawing the object, and constantly checking the similarity between the object and the drawing. Ask students to make a second drawing using this method.

4. Now allow the student to feel the object, study its shape, features, etc. Have tne students trace its shape with their fingers on the paper without looking at the paper.

5. Now ask the students to do the following:

> "Without worrying about how realistic your drawing looks, look at the object and as you 'feel' it with your eyes, use your pencil to record the path of your eyes on the paper. Absorb the object and let your pencil be the extension of that 'seeing'. It does not matter how good the drawing looks. Just trace the outline as you feel it."

6. Discuss the elements of the object that were "discovered" when using each of the drawing techniques. Additional Sources for discussing different ways of "seeing" are:

> The Zen of Seeing
> Drawing on the Right Side of the Brain

Note: You may wish to postpone conventional drawing until after students have tried to draw by feeling. Another approach would be to conventionally draw a different object before beginning this process.

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Content Ideas:

1. Math - Plane and solid figures (e.g. rectangle, square, rectangle, sphere)
2. Social Studies - Maps (e.g. N.Y.S. relief); Realia (e.g. tools from the Homespun era, Ben Franklin's eyeglasses).
3. Science - Simple Machines
4. English - Character or setting from a story

## ANALYSIS

### Grouping of Elements

Definition: The process of combining elements into classes based on similar characteristics.

Note: This analysis activity is designed to streamline the list of elements for the purpose of having a manageable number of units to relate in the next activity, Analysis of Relations. If the initial list is small in number, this step may be omitted.

General Directions:

1. Do activity Analysis of Elements, or furnish students with a list of elements (preferably on note cards).

2. In teams, students are asked to classify the elements of the system and label each class. The teacher should limit the number of classes of elements (within a certain range) to make further analyses manageable.

3. Compare the classes formed by teams.

4. Have each team defend the approach used to classify the elements, e.g. their classification was simple, functional, thorough.

Example: People in School

1. Classes

   Administrators
   Principal, Vice Principal

   Instructional Staff
   Content Specialists, Coaches, Teachers

   Instructional Support Staff
   Audio-Visual Coord., Volunteers, Librarian, Paid Aides

   Non-Instructional Support
   Custodians, Cafetaria Staff, Office Helpers, Lunchroom Monitors, Secretaries, Maintenance

   Health
   Nurse, Guidance Counselor, Doctor, Psycholigist

   Students
   Seventh Graders, Eighth Graders

2. Comparison and discussion of each team's work. Teams may come up with only two groups (male/female adults/kids), three groups (students/educators/support staff) or many groups (as in the example above).

3. Have the teams defend their method of grouping the elements into classes.

Alternative Ways to Group:

1. Give each team a list of common elements (class0 which they must label. They then share the labels (not the elements) and try to figure out the system to which all the elements belong based on the classes the different teams label. For example: Given "Principal, Vice Principal," students might label them administrators.

2. Randomly pass out cards with an element written on each (Deal them out as if you were playing a card game). Ask teams of students to label the elements they have been given. Have the teams share the labels (but not the elements). Each group must then try to figure out the system to which all the elements belong. This is a more difficult activity than the one above.

3. Give each team several groups of elements which they must label. The teacher then gives each team several new elements, one at a time, which they must fit into an already existing class, or create a new class for.

4. Challenge teams of students to come up with unusual classes of elements in a system. Have teams exchange class labels and attempt to fit all the elements into the other teams classes.

5. Game - Randomly distribute element cards. Have teams label the elements in their possession and choose one or more cards to pass on. With a large group of cards, pass several. Before passing they should submit a hypothesis as to what system the elements belong. This first hypothesis is labeled "A". After receiving a card from the neighboring team, they relabel their group to include the new element, submit the new hypothesis labeled "B", and choose another card to pass. The object of the game is to name the system and the classes within it. The game continues for a specified number of rounds (dependent upon the number of elements and teams). The winner is the team which has accurately identified the systems and its classes the earliest (indicated by the lettered hypothesis).

Example: Periodic Table

1. Randomly distribute cards with Bohr models of the first 18 atoms omitting the numbers in the nucleus.

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2. Use the team grouping game strategy described in the section on alternative ways to group - passing cards, labeling groups, and hypothesizing about the system.

3. After passing one less time than the number of teams, the teams should share their hypotheses about the classes of elements, and the systems. (it is unlikely that students will come up with the periodic table and the classes of elements, so go on to the next step.)

4. Give each team a complete set of the first 18 elements to put into classes.

5. After each team has identified groups and supported them with reasons, they can go on to order the classes into a complete system.

6. Given a new atom, the team should be able to place it in the system. They should also be able to predict the Bohr model of the next atom in the table.

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## ANALYSIS

### Grouping Elements into Classes, Activity

Purpose: Elements in a system can be grouped in several different ways. This activity is designed to develop the skill of using different criteria suited to a particular purpose for grouping of elements.

Definition: To group elements according to criteria or identify the criteria used for grouping after the groups are formed.

General Directions:

1. Grouping may be done intuitively (unidentified criteria) or based on a specified criteria. This activity uses the idea of "missing parts" to help students to focus on what characteristics they are using to group elements.

2. Give small teams of students the elements of a system written on cards. Ask each team to group the elements based on similar characteristics. They should record what criteria they used to form each group.

3. Now have the students delete the characteristic of each element that made it parts of its group. If the elements are visual, the characteristic may be marked through or erased. If they are symbols, or words, the deleted characteristic should still be indicated in some way.

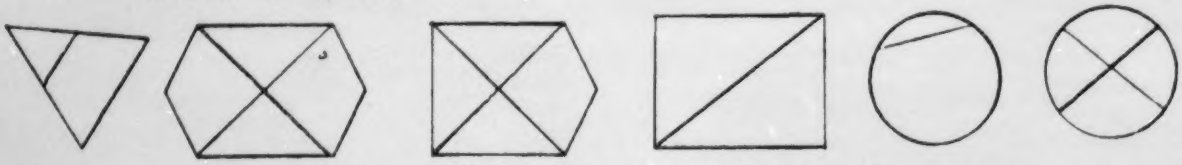
4. Each team regroups the elements without using the deleted characteristic of each.

5. Teams share their original groups, deletions and new groups.

6. Discuss the effect on the total system analysis of using groups which are not related, parallel, or meaningful. Which groupings tell the most about the system? What purpose would each serve? Which is more difficult, grouping according to a pre-specified criteria, or grouping intuitively? Which is more difficult, making groups that are related, or making groups that are not related to each other? Which is more useful?

Example:

Geometric Figures



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Groups:

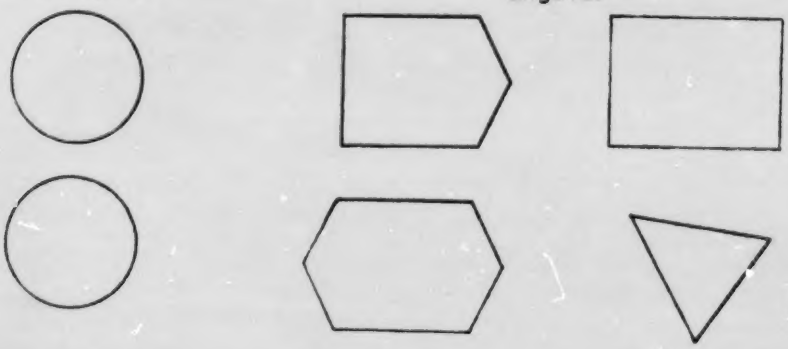
1. "X" in figure

2. line in figure

Reclassify elements with former classifying characteristics deleted.

curved

angular



Content Ideas:

1. The vocabulary related to any key idea.
2. English - Visual imagery in character descriptions. (List a dozen terms which are highly descriptive, and can be taken several ways. Students will be forced to explore each term when they regroup.)
3. Math - Triangles (can be grouped by type, size, congruency)
4. Science - Lab equipment, Energy sources

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## ANALYSIS

### Relationships

Definition: The process of associating classes or elements in a logical or natural way.

General Directions:

1. Do the activities on analysis of elements and classes, or furnish students with a short list of elements or several labeled groups of elements for analysis.

2. In small teams, students are asked to identify all possible relationships among the labeled classes of elements (or the elements themselves if there are a small number of them). This may be accomplished by exploring the relationship between two groups of elements at a time until all possible combinations have been explored. The two methods used in the example below are analogies and Venn diagrams (see Alternative Ways for Stating Relationships).

3. Compare relationships described by the different teams.

4. Each team must defend the relationships developed by another team.

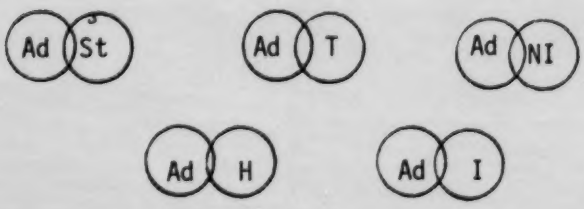
5. Each team must portray their most vivid relationship nonverbally.

Example: People in School

1. Analogies
   Administrators Students
   Description of relationship - no relation, discipline, awards
   Office helper, (employer/employee), small talk
   Sample analogies:
   Administrators: Students:: Policemen : Driver
   Administrators: Students:: Queen Bee : Workers

2. Venn Diagrams
   The degree of relationship is indicated by the amount of overlap of the circles.
   Sample Venn Diagrams

| | |
|---|---|
| Administrator - Ad | Teacher - T |
| Students - St | Non-instructional support - NI |
| Health - H | Instructional Support Staff - I |

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Note: It appears from these diagrams that administrators interact with personnel outside the building. Such relationships may represent unstated assumptions which may be important in identifying the ordering principle of the system in the next analysis activity. An additional assumption is that the relationships being diagrammed are the percentage of time spent in contact. It is important to identify unstated assumptions in systems analyses because they may be erroneous and because they may control the entire analysis or be in conflict with a controlling criteria.

Alternative Ways for Stating Relationships:

1. Simple statements (verbal)
2. Analogies (non-verbal)
3. Listing common/uncommon characteristics

## ANALYSIS

### Relationships, Activity

Purpose: Students may not realize that a set of elements that is a system may also be part of a whole itself. This activity is designed to teach students how to focus on a system as a part of a whole.

Definition: The process of associating classes of elements or elements in a logical or natural way.

General Directions:

1. Choose a system from your current unit of study.
2. Identify the elements of that system and group them into classes based on characteristics they have in common.
3. Give each team of students a group of elements which are a class and ask them to explore the relationships among the elements of that class (see Relationship Analysis).
4. Ask each team to come up with an ordering of the elements of the class which form a system different from the original system to which the class belonged.

Example: Triangle

1. Paper triangles of varying sizes and shapes are distributed to teams. They are asked to list the elements of each triangle. They may label the parts or dissect the paper triangles to represent the parts.
2. They will probably come up with a list of elements such as the following:

| | |
|---|---|
| Angles - a,b,c | Vertices - a,b,c |
| Sides - ab,ac,bc | infinite # of points |
| area | perimeter |

Classes = Angles, Sides, Vertices, Measures

3. Ask each group to select a class to explore. Use the class of angles as an example to do together as a total group.
4. Some relationships which exist among the angles are:
   Each has two rays, a vertex, a measure, an interior, an exterior, an infinite number of points in the rays, a bisector that separates the angle into two equal parts. Each is a part of a larger system of a circle ($360^{\circ}$).
5. Challenge the students to come up with a new system to which the angles of a triangle belong. If necessary give them the hint that the new system is ordered based on the class of vertices. Encourage students to manipulate paper cutouts of the angles.

6. System within a system - When the vertices of the three angles are placed so as to form a common vertex such that one of the angles is adjacent to the other two, a straight line will be formed.

Content Ideas:

1. Science - Block and Tackle, River, Bacteria, Body
2. Math - Other geometric figures, the number line
3. Social Studies - Government, the city (a football team)
4. English - An anagram, sentence, novel, story, paragraph

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## ANALYSIS

### Ordering/Systematizing

**Definition**: The process of organizing the relationships to structure the system.

**General Directions**:

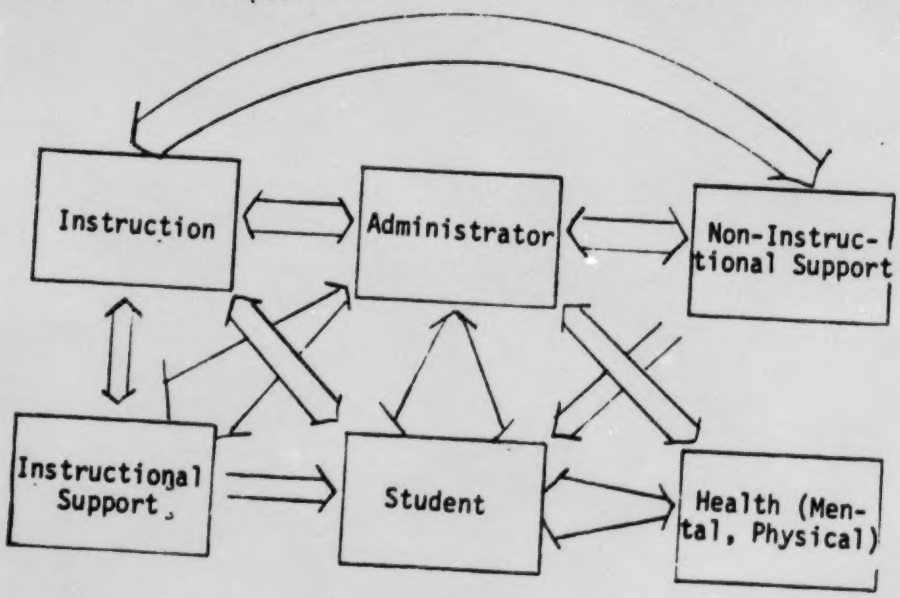
1. Each team should organize the classes and the relationships among the classes into a total system. Each class of elements must be related directly or indirectly to every other class. The structure should probably be represented visually.

2. Have each team defend and discuss their organization.

   Note: At this point it should be very interesting to see the different ways in which the teams have put together all the elements into a cohesive whole. A discussion of unstated assumptions is especially important at this point because it will help the students to identify the multiple outcomes of system analysis; all based on the perspective the analyzer takes.

**Example**: People in School

1. The classes of people were organized based on the amount of input or service they provide to each other. The size of the arrow indicates these relationships.

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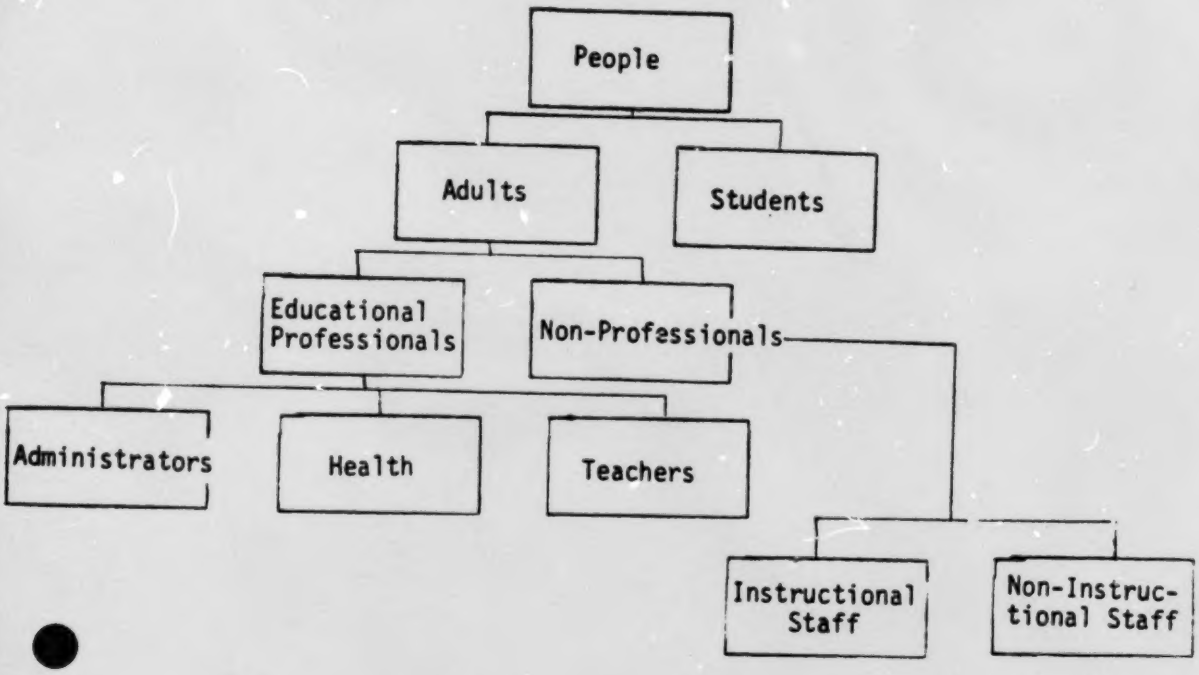
2. Using another set of classes the relationships among them were orgainzed in a hierarchical structure.




Alternative Ways to Order

1. Hierarchically - organized according to rank, capacity or authority
2. Alphabetically - e.g. a dictionary is a system orgainzed completely on this basis
3. Spatially - e.g. People in a School by areas of the building
4. Inherent Characteristics - e.g. sex, race
5. Taxonomic - the arrangement of elements into categories based on the common characteristics in varying degrees of distinction

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## ANALYSIS

### Ordering, Activity

Purpose: If order in a system is not immediately apparent, students may not recognize that perseverance may yield a highly useful order. This activity is designed to give the students a partial list of elements with clues which make the order among them less than obvious but with the assurance that there is indeed a unifying factor.

Definition: The process of organizing a set of elements which are related, into a structured whole.

General Directions:

1. Students are given a list of elements which are apparently unrelated and instructed to order them into a system.

2. The list of elements may be kept by the students for several days. They may use any sources they wish to try to discover the key to the organization of the elements. If desired, cooperative effort may be encouraged by having the students work in teams. They may accomplish the task much more quickly if they divide up the elements to be investigated.

3. As the relationships among the elements are uncovered, students make hypotheses about what system all the elements belong in.

4. If teams are used for this activity, the winner can be on the team that comes up with the best explanation of how all the elements fit together as well as a name for the system.

Content Ideas:

Science - The crew of Calypso (minus Cousteau, of course)
The internal parts of the finger
Coordinates of several major cities (minus the degree symbols)
Uncommon elements found in the ocean

Math - Sequence of numbers, find the next one
Coordinates in a plane which make a figure

Social Studies - Rochester City Council Members
Obscure Hall of Famers (Baseball, Etc.)

English - Words of a song in random order
Authors of a certain period
Works of an author

## ANALYSIS

### Ordering, Activity

Purpose: Systems can be ordered by time or by logic. This activity is designed to focus student's attention on the logical relationships of elements within a system. The purpose is to teach students the steps in a specific content area sequence and to develop their skill in identifying order in a system.

Definition: The process of logically sequencing a list of elements from a system.

General Directions:

1. Choose a system in which the elements are organized in a logical (but non-chronological) sequence.
2. Rearrange the elements into a non-sequential list.
3. Have students rearrange the list so that they make sense.
4. Ask the students to describe the logic of the sequence they created.

Content Ideas:

1. Math - Steps on finding the surface area of a rectangular prism.
2. Science - Steps in separating a mixture.
3. Social Studies - Steps in forming a government.
4. English - Steps in forming a sentence.



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## ANALYSIS

### Ordering/Systematizing Classification, Activity

Definition: The process of describing how the ordering criteria unify the classes and relationships of the system.

General Directions: Teams should define and describe the criteria used to order the system in terms of the following:

1. What about each of the elements or classes made you group them the way you did?

   a. Did you group them based on something that is natural about them? If so, you used a criterion inherent.

      Inherent = existing as an intrinsic characteristic

   b. Did you label the elements or classes with a name that did not describe a characteristic? If so, you used an assigned criterion:
      Assigned = artificial descriptors of a class or element.

2. How do the parts of the systems fit together in terms of order?

   a. Is the order of the parts not important in terms of order? If so, it is a static order:
      Static = order is not an essential characteristic of the system.

   b. Does the flow in the system have to be in certain order and happen over a period of time? If so, it is a chronological order:
      Chronological = order is an essential characteristic of the system.

   c. Does the system have order, but the order can be changed without changing the system? If so, the order is sequential:

      Sequential = order is important, or may be applied meaningfully to the system, but is arbitrary and multidirectional.

3. Have teams compare the criteria they used for their system analysis and describe how and when that system analysis might be useful.

4. Based on definitions the teams can classify their system using the following flow chart.



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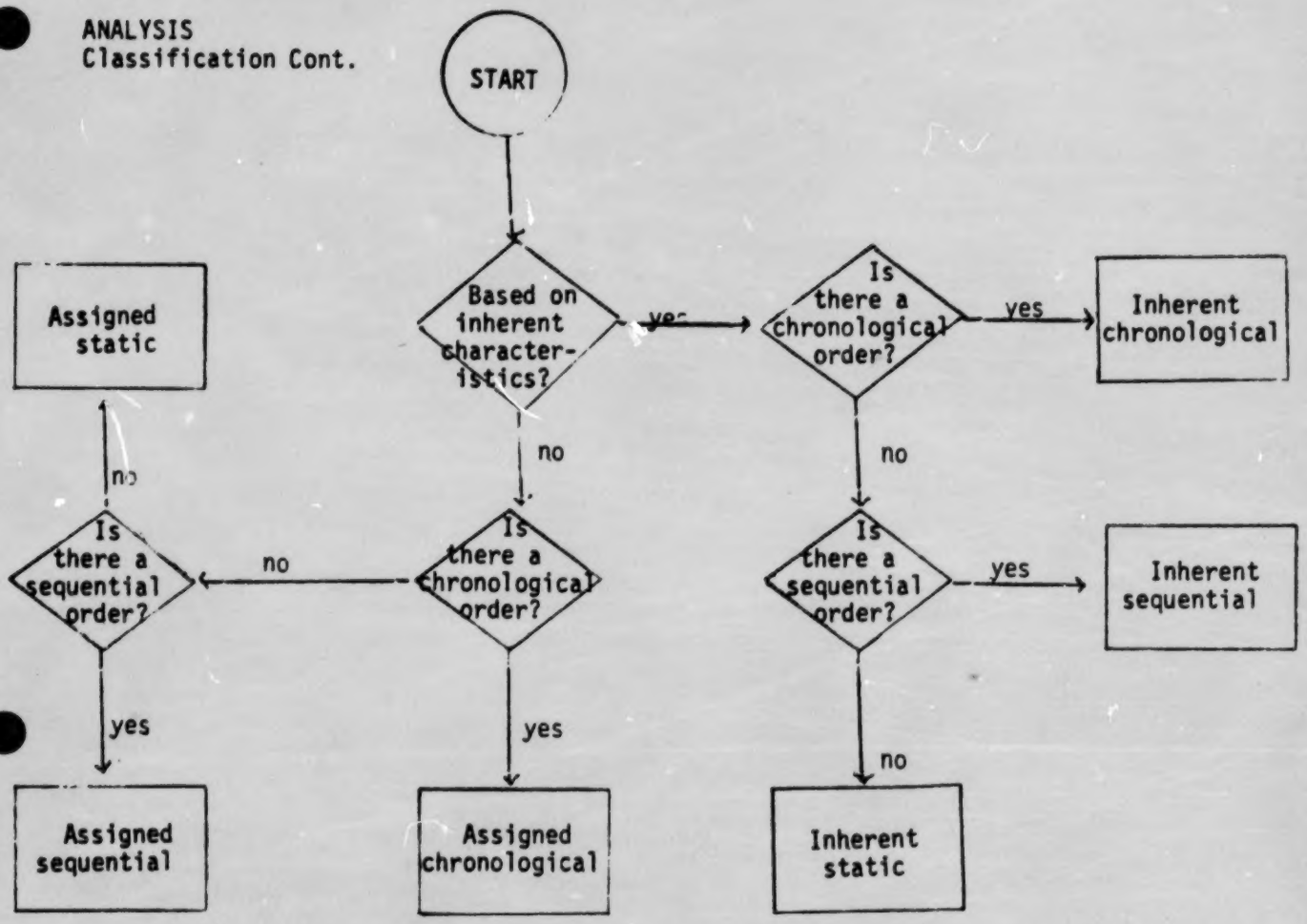
ANALYSIS
Classification Cont.




Example: People in School

1. The amount of input or services rendered is not a natural characteristic of those people but rather a function of their role in the chool. The system analysis is therefore based on ASSIGNED CRITERIA. The degree of influence does not occur in any particular order but has many events occuring simultaneously. The system analysis is therefore STATIC.

2. This system analysis would be useful for a Board of Education considering job-cutting. Recommendations could be made on the roles each group of personnel play. The same type of system analysis could be used to provide input for improving the efficiency of services and establishing priorities for services.



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## SYNTHESIS

Definition: The process of relating multiple elements into a single whole.

General Directions:

There are four processes which may be considered synthesis: Hypothesizing Argumentaion, Summarizing, and Creativity. Each of these processes can result in a new and useful product.

Unlike analysis there is no stepwise procedure that guarantees a product. Instead there is an art in the combination of the elements that depends on the richness of the process.

Content Ideas:

Synthesis occurs AFTER analysis so a thorough mastery of the content precedes the use of these techniques. They are used effectively at the end of a unit to fulfull the primary purpose of gifted education: to help students to go beyond the information they master to use it to produce more information.



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## SYNTHESIS

### Hypothesizing

Defintion: The process of reaching a likely conclusion which accounts for two or more (not nesscessarily related, but available) pieces of information within a total picture.

General Direction:

1. Present students with unrelated or apparently unrelated pieces of information (altogether or one piece at a time).

2. Ask students to give a logical explanation for how each piece of information fits into a total picture.

3. Students may modify or retain their hypothesis after getting new pieces of information.

Example: Math (Instruct students to assume all exhibits are facts)

1. After each exhibit they should make a hypothesis which explains all data which has been seen up to that point.

2. Exhibit A: 1+2 = 3

   One possible hypothesis: Addition of numbers

   Exhibit B: 2+2 = 4
   H: Addition of numbers with sums 4, or addition of 2 to other numbers.

   Exhibit C: 4-1 = 3
   H: Addition and subtraction of numbers 4

   Exhibit D: 2-3 = 4
   H: ? (Students may be unable to fit strange new data into previously obtained data until they have more information and can discern patterns.)

   Exhibit E: 3+4 = 2
   H: ?

   Exhibit F: 3+2 = 0
   H: Mod 5 system addition and subtraction (confirmed because it accounts for all of the data. It is not necessarily the only hypothesis which does so.)

Content Ideas:

1. "Black Box" activity. Place one or more objects (related to the content area) in a shoe box. Seal it. Pass it around among the students and ask them to hypothesize about its contents. Give hints about the interior construction of the box or the objects and ask for refined hypotheses.



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2. Archaelogical dig. There are several variations of this activity. Artifacts can be buried in a box of dirt. Students make grids and replicate archaelogical techniques. Another way to do this is called "Garbage Bag Archaelogy" in which the garbage of some groups of people is available as clues to their lives. Students make hypotheses based on the items as they are "discovered."

3. The future is an incomplete system for which the present provides the clues. Relevant information from futurist sources may be added to help students to make hypotheses which are as complete and supportable as possible.

4. Unfinished stories require students to examine all the data (Characters, plot, setting) presented in the story and formulate a reasonable hypothesis about the outcome.

## SYNTHESIS

### Argumentation

Definition: The process of supporting a hypothesis with a set of statements containing facts (premises).

General Directions:

1. The arguments produced in this situation are called inductive because the conclusion is not proven by the premises but only supported. It is probable but not definite. Inform students that the arguments produced are not intended to be conclusive, but only the best possible defense of a position.

2. Give students (or have them generate) a hypothesis and any information which might be relevant. Students may be grouped in teams for the creation of arguments.

3. Each student (or team) is instructed to organize, add to, subtract from, etc. the data to make an argument which supports the hypothesis. Students will intuitively use many logical connectives to build an argument. "If - then connections, conjunction" and other specific logic rules may be introduced.

Example:

1. Hypothesis to argue for or against:

   "Bicycles should have equal rights on the road with motorized vehicles."

2. Relevant Data:

   a. There are more people under age 30 than over that age.

   b. People who cannot drive need to get places.

   c. Bicycling is energy conserving, non-polluting, and good exercise.

   d. Many more people are in automobile accidents of a serious or fatal nature than in bicycle accidents.

   e. Teenagers need the independence a bike gives them.

3. Argument: (sample)

   If it was safe for me to ride to my friends' house,
   my parents would not have to drive me there.
   This would give me independence, save energy, help with
   pollution, and be safer for my family because
   they would be in the car less.
   I would be healthier because of the exercise I would get.

Bicycles should have equal rights with motorized vehicles to insure the safety of bicyclists.

Content Ideas: (Hypotheses to make supporting arguments for)

1. Math - Areas of an irregular figure, part of which requires the use of formula not available to the student.

   All elements (except 0) in odd mod multiplication systems have inverses.

2. Science - Phases of the moon have effects on human behavior.

   There are no undiscovered elements below the number 103 (this hypothesis can be supported with several different combinations of facts).

3. Social Studies - The Federal Government would function equally as well without the President.

   Iroquois' ancestors migrated from Asia.

4. English - In Where the Red Fern Grows, the red fern did not have to be introduced at the end for the story to be meaningful.

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## SYNTHESIS

### Argumentation: Inductive Reasoning, Activity

Purpose: Hypotheses can be supported using several different lines of reasoning. This activity is designed to teach students the three inductive methods of enumeration, probablility and analogy.

Definition: The process of supporting hypothesis using examples (enumeration), sampling (probability), or analogy.

General Direction:

1. There are at least three different ways of collecting and organizing data to support a hypothesis. Choose something for all the students to make a hypothesis about that they can then collect data on.

2. Students should then organize the data in argument form to support their hypothesis.

3. Students share the arguments they have developed and discuss the strength of each one.

4. Introduce the methods of:

   a. Enumeration - List of case studies or examples of the hypothesis. The more case studies and the more comprehensive the case studies the stronger the argument.

   b. Probability - Percentage of cases in a sample from the population. The more representative the sample is of the population, the more strength the argument has.

   c. Analogy - An example (s) which has a parallel conclusion to the hypothesis. The more characteristics the two situations have in common, the stronger the argument.

   Challenge students to combine the reasoning methods and data to create the strongest possible argument. Why is it the strongest?

Example: Observation of School Environment

1. A ceiling tile may serve as the basis of data collection for proof of a hypothesis about how many holes there are in each tile in the building. Divide the class into teams and give them these instructions.

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"There are many ways to support a hypothesis. In this activity you will be asked to collect and organize data into an argument to support the hypothesis: 'There are 100-200 holes in each ceiling tile in the building! You may collect data and organize it in anyway you think provides a strong support for the hypothesis. Try to build a convincing argument. You should work in teams to write a brief description of how you intend to collect data. You may go any where in the building and use any method you want that is not disruptive to others. You must have your plan approved before you begin to implement it."

2. Students may collect data in any of the following ways:

   a. Count all of the holes in several tiles in the room (enumeration).

   b. Count all of the holes in several tiles in several areas of the building (enumeration and probability).

   c. Divide a tile into segments, count and multiply (probability).

   d. Count features of mass produced elements of the building, e.g. all the lockers have six vents (analogy).

3. Each team presents their argument to the rest of the class. A teacher led discussion of the reasoning used may follow each argument. You may want to record the class's analysis on the board or have students record independently using the following chart:

| Date Source | Amount of Time | % of whole analyzed | Strength of Argument |
|---|---|---|---|
| | | | |

Content Ideas:

1. English - Number of parts of speech on a average page of a book by a particular author.

2. Math - Number of workds indicating quantity (e.g. more, less, add, plus). This was an actual research project at a university for the purpose of gauging young children's exposure to math concepts.

3. Social Studies - Comparison of a local group (neighborhood, township) to the nation on a current issue. Students would collect data on the local population.

4. Science - Description of a local climate as compared with official descriptions in such sources as the Almanac. Teams of students should describe the flora and fauna of the school property.

# SYNTHESIS

## Summarizing

Definition: The process of developing a product that condenses divergent elements.

General Directions:

Present students with two or more pieces of information.

Ask students to make one statement about the pieces of information that applies to that data and no others. (Students will tend to make global statements at first, but with encouragement they can make the statements situation specific.)

Note: This activity may become increasingly difficult as the complexity and/or divergency of the following variables increases:

1. Similarity of elements: related; unrelated
2. Number of elements; 2, >2
3. Similarity of form of communication of elements; same; totally different (e.g. song, picture, graph, paragraph, poem, television, idea, objects)
4. Similarity of form of communciation of the elements and form of the product: Same; entirely different(e.g. two paragraphs summarized in a picture, two graphs summarized in a billboard.)

Example: Using comic strip frames, give two similar frames to each team of students (4-6 teams).

Ask each team to develop a one-sentence description that condenses or summarizes the two frames.

Present the pairs of pictures to the whole class on transparencies. Read one description at a time and ask the class to vote for the picture they think that it is a description of. Record the results on the board.

Return the descriptions to the teams for rewriting.

Conduct the voting session again.

Discuss what factors condense elements in a way specific to a set of elements.

Content Ideas:

Any content may be used for this activity as long as the elements and the product of summarization can be compared by the large group. Paragraphs, for example would have to be on transparencies or reproduced for the entire group.

A more elaborate example of this activity would be for each group to view several different episodes of the same television series or several different commericals for the same product.

## SYNTHESIS

### Fluency/Flexibility/Originality

Definition: The process of relating previously unrelated ideas, events, or pieces of information in a unique and useful product.

General Directions:

There do not appear to be any step-by-step instructions for pulling together unrelated ideas, but for students who do not do it naturally, a number of techniques have been developed which stimulate thinking to be more original. There seem to be several levels of difficulty in using these techinques.

1. The students produce multiple relationships some of which may be useful. The emphasis is on producing many ideas, rather than just "good" ones. (Brainstorming, Attribute Learning, Scamper).

2. The teacher combines ideas and asks the student to explain or elaborate on the relationships of the elements. For example: "A machine is like a sentence because _____" (Analogies, Historically creative accomplishments).

3. Students search for a unique and useful solution to a specific problem. (Forced relationships, Morphological Analysis, Synectics).

Content Ideas:

1. Rediscovering the unique and useful solutions of the past.

2. Unsolved problems of the present.

3. Potential problems of the future.

4. English - Transformational grammar as developed by Chomsky, how to write a best seller, the art of persuasion.

5. Math - Beyond Euclidian geometry, the fifth dimension.

6. Science - Archimedes discovery, Darwin's theory of evolution.

7. Social Studies - Utopian societies, Roosevelt's solutions to the depression.



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## SYNTHESIS

### Fluency/Flexibility/Originality
### Brainstorming, Activity

Definition: The process of deferring evaluation of ideas in order to generate as many ideas as possible.

General Directions:

Research has shown that instructions to a group to "list as many ideas as possible" produces more original ideas than instructions to "list as many good ideas as possible. Brainstorming can be used by any group of two or more people on any topic by using the following rules:

1. Accept every idea. No criticism or praise of ideas is allowed.
2. The more ideas the better. Go for long, long lists. Get groups to compete for the longest list. (The ideas get more original as the list gets longer.)
3. The crazier the ideas the better. (The whole purpose is to get outside your normal way of thinking.)
4. "Piggy-backing" is encouraged. Build on other people's ideas. It's a complement to them that their idea spurred you on.
5. Group elements of lists (number of elements). Relate groups (Forced relations).

Attribute Listing - In this activity, the goal is broken down into parts and the attributes of each part are listed using the brainstorming rules. (Ideas for improving each of the parts are generated using the list of attributes.)

After brainstorming for ideas, it is important to evaluate them in terms of some specific criteria. Students should ask: "How can we use (this idea) to (specific goal or criteria) ?"

Example:

1. Choose a specific topic or task such as how to learn a list of vocabulary words.
2. Introduce brainstorming as a problem-solving technique for getting out as many ideas as possible. Post the rules for the class.

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3. Divide the class into random groups of three to five students. Each group should have newsprint or chart paper and a marker. Each group should select a recorder.

4. Start with a practice session, instructing the group to think of as many things as they can that the class does in a day. The recorder lists these on paper.

5. After five minutes, stop the listing and the groups quickly count and share the number of items they recorded.

6. Ask:

   "Did everyone get a chance to contribute?"
   "Were you able to avoid criticizing and praising each other's ideas?"
   "Did you generate ideas the whole time?"

7. After practice session, announce the task of learning a list of vocabulary words. Allow a few minutes for questions about the task.

8. Allow ten minutes for brainstorming. Encourage groups who say they are finished to keep trying to get more ideas. Remind them that the crazier the idea the better.

9. Ask each group to evaluate their list and choose their two best ideas to share with the large group. They should plan to tell why they thought these two were the best (the criterion they used).

10. Post the lists with the best ideas circled. Ask each person in the group to choose an idea to try.

11. Discuss brainstorming as a technique for getting many ideas. Ask:

    Did you come up with any ideas you hadn't thought of before?
    Why does the lack of evaluation help the process?
    When might you use this in your own life?
    When might we use it in class again?

Content Ideas:

Science - Ways to Use Simple Machines, Ways to Teach Electricity
Social Studies - Ways to deal with secession, Things the Iroquois could have done to preserve their culture.
Math - Ways to use (any math process) , Ways to represent a part of a whole.
English - Methods to communicate an idea, Types of characters to include in a story.

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## SYNTHESIS

### Fluency/Flexibility/Originality
### Forced Relationships, Activity

Definition: The process of relating previously unrelated elements to solve a stated problem.

General Directions:

There are four different forms of forced relationships. The directions for each technique are listed below:

Listing - State a problem and then provide a list of unrelated objects. Each object is then associated with the given problems.

Catalog Techniques - State a problem and provide a catalog of objects. An object is picked at random and associated with the given problem. This is repeated several times.

Focused Relationships - State a problem and provide a list of objects that are in some way relevant to the problem. Each object is then related to the problem. After all relationships have been created, an evaluation of each is discussed.

Arbitrary Forced Relationships - No problem is stated. A group of arbitrary words, objects, or ideas as provided. Two objects are then chosen at random and put together in some way. The ideas that are produced are then developed.

Example: Listing Technique

Problem: Raise a sunken boat

Objects: Hat, car, tomato plant, record, door, wastepaper basket, donut

Associations: Hat - used to take air from the surface to the boat, used to shade a worker to prevent sunburn while trying to raise the boat.

Car - Engine used for power for a winch, tires used for markers or flotation devices.

Tomato Plant - Feed it Rapid Gro and place it under the boat, take oxygen produced and pump it into the boat.

Content Ideas: (for all except the last technique)

1. Science - Preventing tornadoes, stopping acid rain.
2. Math - Imaginary numbers, what are they? Volume of an irregular solid.
3. Social Studies - Getting people to vote, paying for urban renewal.
4. English - Descriptive words and phrases, various forms of a word and the different parts of speech it could be.

## SYNTHESIS

### Fluency/Flexibility/Originality
### SCAMPER Techniques, Activity

Definition: The process of changing something about a system in order to get a new perspective on it.

General Directions:

1. Select a topic to SCAMPER on.
2. Divide the class into seven groups and assign each a letter of SCAMPER to use on the topic.
3. Have groups brainstorm for all the things they could apply their technique to, apply it to several, and afterwards evaluate all their ideas, and choose one to share with the group.
4. After all the ideas have been shared, allow each student to select one to elaborate upon individually or in partnership with others.
5. SCAMPER techniques

| | | |
|---|---|---|
| S | Substitute | To exchange a person or thing for each other. |
| C | Combine | To print together into one. |
| A | Adapt | To adjust in order to meet a condition or serve a particular purpose. |
| M | Magnify | To make larger in form, quantity, value, etc. |
| | Minify | To dimish in size, weight, frequency. |
| P | Put to other uses | To put to a use not originally intended. |
| E | Eliminate | To reduce a part or whole by taking something away. |
| R | Reverse | To make the opposite. |
| | Rearrange | To put elements into an order not previously apparent. |

Example:

1. To introduce students to the SCAMPER techniques, ask them to work on how we can make our classroom a better place.

2. Divide the class into the seven groups and assign each a technique. Since analysis precedes synthesis, their first task is to list the elements of the classroom such as:

| | | |
|---|---|---|
| dimensions | desks | boards |
| colors used | chairs | windows |
| organizations | teacher's desk | floor |

3. After listing the elements of the classroom in the large group, the small groups should apply their technique to the problem of improving the classroom.

4. Have the groups evaluate their ideas and choose the best and most feasible to share with the class.

5. Form subcommittees to implement some of the ideas.

6. Discuss using SCAMPER:

   "How was this technique helpful in getting out ideas?"

   "When could we use this in our regular classroom?"

Content Ideas:

Science - Improving our use of engery, changing a system to meet new conditions (previously unknown factor appears).

Social Studies - Ways to revitalize cities, ways to identify an unknown artifact.

Math - Changing geometric figures and recomputing area, changing values in an equation and regraphing the result.

English - Modifying the main character and analying the effect on the story. Changing a sentence into another form (simple to complex) while maintaining the meaning.

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## Evaluation

Definition: Judging the value of appropriateness from an objective or subjective viewpoint.

General Directions: Evaluation occurs in conjunction with analysis or synthesis. References in activities to "defend", "choose" often indicate evaluation thinking is required.

In subjective evaluation the goal is to train the student to personally respond, to recognize that response, to act based on that response. Values clarification activities are helpful in providing experience for students in this area.

Objective evaluation is based on publicly identifiable criteria. Students need practice in generating objective criteria and then applying them. They also should be able to recognize unstated criteria used in evaluations they encounter.

The most important instruction in evaluation is in distinguishing between subjective and objective responses. This forms the basis of being able to determine which is appropriate in a given situation and how to respond to statements based on each kind of evaluation. Because subjective evaluations are based on values, the appropriate response is clarifying and/or persuading. Objective evaluations are based on identifiable criteria and evidence so the appropriate responses are challenging and convincing. Mixing up the responses to the two kinds of evaluation creates a barrier to effective communication and may even lead to conflict.

Activities in evaluation begin with separate experience in subjectives and objective evaluation and build to situations requiring one or the other or a combination of both analysis of other's viewpoints such as those presented in editorials also require evaluation.

Content Ideas: In evaluation activities the product will usually include a brief description of the system(s) being evaluated, whether the evaluation is subjective or objective, the criterion(a) used and a summary statement.

Science - Doomsday reports form political sources (the report to Carter) and religious sources; evaluation form a scientific perspective and a religious perspective (In the Beginning by Isaac Asimo) Scientists' reactions to the misuse of their discoveries.

Social Studies - Comparison of several subjective accounts of an historical event; evaluation of a political event (election of a particular President) from the viewpoint of several special interest groups; "I would (would not) like to have lived.... (in an Iroquois village, during the civil war").

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English - Personal reaction to a character versus an objective evaluation of that character within the framework of the story; ranking of the parts of speech based on some criteria (i.e. frequency of usage, importance in the sentence, etc.); persuasive versus argumentative writing.

Math - Subjective (neatness, organization, etc.) and objective evaluation of a math homework paper; comparision of two processes for solving a problem from both subjective and objective viewpoints.

Content Ideas:

Science - Aesthetic or personal evaluation of an experiment or (i.e. the "beauty" of a reaction); Emotional expressions (facial or verbal) to scientific facts.

Social Studies - Alien (man form Mars) perspective and evaluation of a government's functioning; evaluation of E. C. Schumacher's evaluation in Small is Beautiful".

English - Personal reaction to "nickel words" versus "dollar-bill words" in a communication; identification of a character's predominant evaluation style and the effect on the story of a change in that style.

Math - Discussion and production of an "elegant" proof; subjective evaluation of a specific concept.

Further Sources of Activities:

1. Subjective

Simon, S. B., Howe, L. & W., Kirschenbaum, H., Values Clarification: A Handbook of Practical Strategies for Teachers and Students., N.Y.: Hart Publishing Co., Inc., 1972 ($3.95)

Canfield, J. and Wells, H.C., 100 Ways to Enchance Self-Concept in the Classroom. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1976, ($6.50)

Raths, L. E., Harmin, M. and Simon, S. B., Values and Teaching. Columbus, Ohio: Charles E. Merrill Publishing Co., 1966.

2. Objective

Meeker, M., Teaching Judgement, Planning and Decision-Making: An SOI Workbook for Teachers. El Segundo, Calif.: SOI Institute, 1970. (214 Main St., 90291)

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# EVALUATION

## Subjective

Definition: The process of making judgments based on personal criteria (traditional values, intuition, introspection, and experience).

Traditional Values: information, opinions, beliefs and customs handed down by word of mouth or by example in culture.

Intuition - "A way of knowing" directly, excluding all inference, reasoning, logic and the employment of symbols and ideas. An innate or instinctively known hunch or insight.

Introspection - The observation and analysis of one's own mental states and activities.

Experiences - the sum total of one's various activities and events that form one's identity.

General Directions:

1. Pick something to be evaluated.
2. Focus on the criteria for an evaluation by getting students to a) evaluate the same topic twice, or b) evaluate two similar topics.
3. Identify the criteria using the formal definitions given above.

   Evaluate the strength of the criteria.

Example:

1. Pick a song with lyrics and play it.
2. Have each student write a statement about how they felt about the song with an explanation of why they felt the way they did (collect the papers).
3. Discuss the song in depth relative to the meaning of the lyrics, the tune, the song-writer's intention, etc.
4. Replay the song.
5. On a separate sheet of paper, have students repeat their evaluations.
6. At this point, explain the different criteria upon which subjective evaluations are based (i.e. traditional, values, intuition, introspection, and experiences). Return the first set of evaluations.
7. Have the students identify and describe the criterion (criteria if their evaluations are different ) upon which their evaluations were based.

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8. If there was a change in the individual's evaluation between the two evaluations, discuss whether the person's criteria changed (if so, discuss the strength of the criteria) and/or whether one's perception of the song changed (if so, discuss the effect of the perception on choosing of criteria).

Specific Example: "Sounds of Silence" by Simon and Garfunkel

First Evaluation:

"Darkness is not my friend so I don't like the song."
(Intuitive fear of the dark).

Second Evaluation:

"The song isn't really about darkness as a bad thing its about darkness as a comforting friend in a lost society so I like it alright because I like having friends in a scary situation."
(Intuitive enjoyment of friends, could also be based on experience.)

Discussing the change:

This person's perception of the song changed. His intuitive feelings about the dark did not change but his criteria for evaluating the song shifted with an understanding of the main focus of the song.

Content Ideas: Feelings about the matter itself, particularly girls' feelings about Math and Science.

Science - Sulphuric acid, scientific advancements which have had or have or might be misused, volcanoes.

Math - the most perfect geometric figure, trinominal vs graphic display of the same information, favorite number system.

Social Studies - Marxism, slavery, taxation, Jefferson Davis, virtually any ideology or historical figure (textbook versus autobiogrpahical versus historical fiction accounts make for interesting contrasts.)

English - Story titles, characters, opinions of an author based on one work, then another entirely different one, E. E. Cummings style, textbook versus entertaining prose.

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## Evaluation

## Objective

Definition: The process of making judgements based on impersonal verifiable criteria. Objects of evaluation include observations, experiments, authorities, and the reasoning in arguments.

Observation - The systematic collection and recording of information from the environment.

Experimentation - The control and manipulation of variables for the purpose of examining a particular effect.

Authority - The opinion of a person recognized for his/her experience.

Reasoning - The rise of logical relationships among elements.

General Directions:

1. Present a situation, event, or person and ask the students to evaluate it objectively using a specified criteria that you either give them or they develop.

2. Make available information form more than one source for them to base their evaluation on.

3. Ask them to defend their evaluation.

Example:

1. Present this scenario to the students:

   "It is two months before finals but already you are worried. You need to find a way to pass the final exams in all your subjects. One of your friends tells you about a four-week course being offered at the local YMCA for test preparation. You'd like to go but it costs $25.00. Your parents will only pay for it if it passes an objective evaluation based on the criteria of improving student's scores. Select one of the following four sources of information and work with other students who chose the same source to prepare a case for your parents."

   a. Observation - You are invited to attend a couple of classes that are going on right now. You can go to the first and last classes of the session before yours if you want.

   B. Experimentation - You checked with the guidance counselor at school and he has agreed to show you the scores of last year's students who took the the test preparation class and those who did not take it. He will also show you the previous year's student's yearly grades going into the exam.



GEMS: Higher Level Thinking in the Junior High, Davis et. al., 1981

c. Authority - You find out that a local university professor has been studying different test preparation courses. When you call his office he agrees to talk with you about the findings.

d. Reasoning - You obtain a copy of the course activities and a copy of the review sheet for finals. You find that you can analyze their relationship.

2. Groups should state the problem, their conviction that they have the solution, and the reasons which support their solution. They may add the necessary details to each source to make their cases. They should prepare to present their cases through role-playing their encounter with their parents.

3. When students present their cases, the other groups should challenge their solutions through questioning.

4. After all the cases have been prepared, have each group build the best they can, using any or all of the four sources of information.

Content Ideas:

Science - Ordering the sources information by evaluating the validity of the information from that source (e.g. an hypothesis based on observation would need to be verified by experiment); choose a source of information to evaluate an event (e.g. glass-making).

Social Studies - The overall effect (positive or negative) of a particular event on several different groups, on subsequent history, on those who precipitated the event; the description of a particular historical period (or geography) from authority (written documents) and experimentation (e.g. Thor Heyerdahl's "Ra" to prove it could have been done).

English - Evaluate the use of character development by two different authors; evaluate the style of two poets on the same topic; identify the source of the rules of writing (or grammar) presented in your text.

Math - Evaluate the value of various mathematical operations based on utility in everyday life; evaluate the use of authority versus reasoning in learning mathematical processes.



GEMS: Higher tevel Thinking in the Junior High, Davis, et. al, 1981

## Evaluation

### Subjective, Activity

Purpose: To impress upon the students the fact that no issue is "black or white" but has many shades of gray and to allow students to identify their response to an issue.

Definition: The process of making judgements based on personal criteria.

General Directions:

1. Choose an issue or question as the focus.

2. Identify (with students) the "black and white" positions on the issue. Place each one of these at opposite ends of a continuum on the board.

3. Ask students to volunteer to tell where they lie on the continuum. As they volunteer, write their names on the line where they indicate to do so. When a range of opinions are shown on the continuim, stop listing the names and ask each student to consider where he/she is on the continuum.

Note: The two extreme positions may be posted on opposite ends of the room and the students may indicate their position on the continuim. Identical positions may stand side by side rather than in the line.

4. Divide students into four or five groups with like-minded students in one group. Ask each group to predict how a person from their group would react to a set of particular situations (furnished by the teacher). Also assign to, briefly predict, how another group would respond. Ask the group to role-play or symbolically represent (charades) their values on one issue.

GEMS: Higher Level Thinking in the Junior High, Davis et. al., 1981

## Evaluation

### Objective, Activity

Purpose: To teach students to evaluate a system based on its internal consistency.

Definition: Judging a system based on the identifiable criteria of internal consistency (i.e. how well the parts of the system are related to each other. )

General Directions:

1. Identify a system for students to evaluate.
2. Ask students to list at least three reasons for the existence of this system or three purposes it might have (e.g. a paragraph is a system whose purpose is to communicate an idea).
3. Instruct students to make a chart which lists the elements and has columns to rate each on how it contributes to the purpose of the system.

System: (paragraph)

Purpose: (To communicate a single idea.)

| | Contributes to Purpose? | | |
|---|---|---|---|
| Elements | Yes | No | How |
| ( Sentence 1 ) | ( ) | | (States the main idea) |
| ( Sentence 2 ) | | | |
| ( Sentence 3 ) | | | |

4. Instruct students to draw a conclusion about the internal consistency of the system based on how well each element contributed to the total system.
5. Discuss the difference between objective evaluation based on the internal consistency of a system and objective evaluation based on external criteria. An objective evaluation based on internal criteria is the process of comparing the system to a standard or a comparable system. It does not necessarily evaluate how well the elements of this system mesh to accomplish the system's purpose.

Content Ideas:

Please refer to the definition of system in the ANALYSIS, ELEMENTS section. Any system whose elements can be identified can be evaluated using internal consistency

GEMS: Higher Level Thinking in the Junior High, Davis, et. al., 1981

"WHAT A CHAR-ACT-ER!"

A Literature Unit on Characterization

## Introduction

This unit is designed for instruction of Junior High students in characterization. It is based on the New York State Curriculum Guide to Language Arts; Literature. The activities use a small group format and include the higher level thinking skills of analysis, synthesis and evaluation. In some cases one activity is prerequiste to another.

The New York State objectives are given, followed by one or more higher level thinking objectives. An activity to accomplish the objective and a method of evaluation are also included.

An individual student evaluation for the unit is provided as well as a total group culminating activity.

## Rationale

Someone once said that there are only 99 plots and all the others are only variations on these basic ones. While it may be true that there are basic character types, usually called stereotypes, the variations on these seem to be almost infinite. In order to create interesting, unique characters. Students need to explore the complexities of characters in prominent works of literature. As they study the subtleties of character development by other authors, they not only learn writing but gain insight into the creation of characters as well.

The activities in this unit are designed to focus the student's attention on the many variations and possibilities for characterization. Rather than teaching rules or technique, the teacher acts as a facilitator in the student's search for the critical elements which "make a story work." Because few of us (teachers) are writers ourselves, we would only block the development of gifted students (maybe someday, gifted writers) by restricting them to our conclusions about writing.

We can, however, serve the important role of providing examples of great literature, challenging students to break them up into the pieces that make them work and compare them, and encourage lively interaction among students on these issues. It it this kind of environment that will encourage and support students in their writing.

Objectives as outlined by N.Y.S. Education Department: (pg. 106)

1. "Determine what a character is like by drawing inferences from the various ways in which an author may reveal characters and by recognizing that the speech pattern or style in which a character speaks may give clues to his mood, attitude, or other traits."

2. "Recognize multiple causes for a character's actions and their relationship to a resulting conflict or pattern."

3. "Identify aspects of character revealed when one person reacts to a contrasting character."

4. "Evaluate the credibility of the characterization."

Literature, Characterization

Objective 1: "Determine what a character is like by drawing inferences from the various ways in which an author may reveal characters and by recognizing that the speech pattern or style in which a character speaks may give clues to his mood, attitude, or other traits."

Objective 1a: Deduce a character's personality (moods, attitude, traits) from direct and indirect references to that character and his/her behavior in various situations.

Activity: Divide the class into five or six groups and assign each group a part of a story (book, poem). Instruct each group to identify the elements of their section which have anything to do with the character _____. Each reference to the character should be written on a 3" x 5" card or piece of paper.

Brainstorm for possible things to look for in the passages that might give clues to the character's personality.

After the groups have found all the clues they can (10-15 minutes), ask them to combine all their clues into a schematic of the characters personality. They may add lines, arrows, etc. to make their "picture" of the character's personality clear. (See Systematizing in Thinking Skills section for how to teach students to do this.) Handout 1

Ask the groups to post their character description labeled by the passage they analyzed. No verbal description of their schematic is permissable at this time.

At the beginning of the next period ask all the students to study the schematics they did not help to create and write a couple of sentences about how they interpreted the schematic.

Students return to their original groups and spend five minutes preparing to present the perception of the character they derived from the passage they read( using their classmate's interpretations).

After each group presents their intepretation (2-3 minutes each), reorganize the groups so that each new group has a member from each of the old groups (these new groups have the whole story represented). Ask these groups to do a new schematic of the character's personality which incorporates clues from the entire story.

Groups share final schematics.

Valuation: Given a short story (300 words or less), the student will be able to identify 80% of the clues given in the story to a character's personality, organize them into a whole, and defend that orgainzation.

Objective 1B: Create a slightly new character for an existing story by changing a facet of one of the character's personalities and redo the story to fit the new character.

Activity: Using a list of the elements of the character's personality generated in the previous activity (1a), ask small groups (3-4) of students to change each characteristic in some way. They may wish to make a chart like the following:

| Personality Characteristic | Change | Effect on Story |
|---|---|---|
| Devious | Honest | Would need a new conflict |

After students have suggested a change in each of the major personality characteristics, ask them to choose one to elaborate on. The group will be expected to write/perform/diagram the new story based on the character change. (It may be necessary to suggest division of labor to some groups.) Groups share their new stories, telling why they chose to change a particular characteristic and defending the subsequent changes made in the story.

Evaluation: Give the students a slightly modified character and ask them to list and defend the implications for the story. (In-class evaluation). A longer assignment to evaluate student's success in this area would be to give them to a modified plot and ask them to identify the changes in characters which would be necessary and write character sketches for "before and after" (the modifications in plot).

Literature, Characterization

Objective 2: "Recognize multiple causes for a character's actions and their relationship to a resulting conflict or pattern."

Objective 2a: Identify and describe the relationships among elements which eventually lead to a conflict in the story.

Activity: Begin the period by announcing a pop quiz on the homework assigned for the previous night or classwork the day before.

After students have cleared their desks, and have paper and pencil ready, ask them to answer the following questions on paper.

1. How did you feel when I announced the quiz?
2. Why did you react that way?
3. Why the answer to #2?
4. Why the answer to #3?
5. Why the answer to #4?

Ask the students to continue asking themselves why questions until they can no longer do so and make sense (e.g. "just because").

Have students share their responses in pairs (3-5 minutes).

Still in pairs ask them to apply this analysis strategy to the action of a character which caused a conflict in a story they have recently read. They may do this through discussion or role-playing (one person becomes the character, the other asks why questions). Have them record their why questions and answers in two columns:

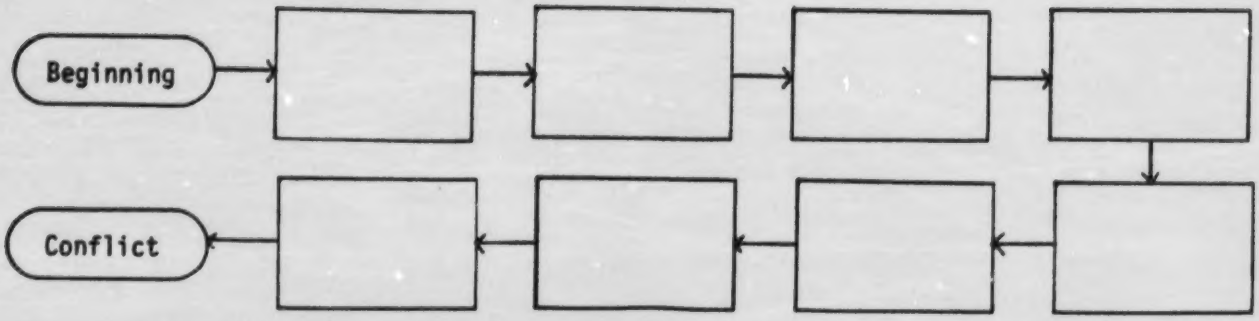
Conflict:

Character Action:

| Why questions | Answers | Fact or Inference |
|---|---|---|
| 1. Why did the character (act in this way)? | | |
| 2. Why ..... ? | | |
| 3. Why ..... ? | | |

In the third column ask them to tell whether each answer is a fact from the story or an inference they have made.

Ask each pair to make a flow chart of the chain of events or circumstances leading to the conflict.




Objective 2b: Generate multiple outcomes from one set of circumstances.

Activity: Prepare a flow chart for two or more characters in a story whose actions result in the conflict of the story. Read the story and present the flow charts, omitting the last few blocks (enough to allow for alternative endings).

Have groups of students (4-5) work together to write an ending to the story and complete the flow charts.

Compare the work of the groups. If they are all the same (which is highly unlikely) have them brainstorm for other possible outcomes.

Evaluation: Give the students the "Beginning" and the "Conflict" of a story. Ask them to fill in the chain of events in between for a specific story.

Literature, Characterization

Objective 3: "Identify aspects of character revealed when one person reacts to a contrasting character."

Objective 3a: Deduce new information about a character based on his/her interaction with another character.

Activity: Choose a story or novel with several characters (more than 5). Assign each student to study one character and complete the single character diagram (Handout 1). In assigning students you will need one fewer students in the group than you have characters because later on in the activity you will want students who studied the same character to pair off with a student who studied each of the other characters. To get the right number of characters you may omit minor characters.

After each student has completed this (it could be homework) ask students to identify the other characters with whom their character interacts in the story and briefly describe (in a word or phrase on the lines with arrows on both ends) those relationships (Handout 2). If a character did not interact with another character in the story, have the students hypothesize about what their relationship would be.

Ask students to rank (evaluate) the relationships on the basis of how significent they were to their character in the story.

Pair students so that each character meets with all the other characters. (For example, characters A and B would meet, than A with C and B with D, and so on.)

Give the pairs of students the two character diagram when they meet (Handout 2). Instruct them to describe the interaction between their characters on the angled lines between them.

Post the diagrams and ask each group to defend their inferences based on the various interactions of their characters.

Evaluation: Give the students two character sketches from the story just analyzed (on the two-character diagram perhaps) with an opening line from one of the characters (one you invented). Ask students to complete the diagrammatic description of the interaction based on what they know about the characters and/or write a dialogue which elaborates on the interaction.

Objective 3b: Elaborate on the contrast in characters by exaggerating the characteristics of each character.

Activity: Have students identify the contrasting characters in a story and describe their personalities in a two-character diagram.

Read the students your favorite fairy tale. In small groups ask them to complete a two-character diagram on the contrasting characters.

Instruct the groups to compare the contrasting characters from the assigned story and those of the fairy tale. (Fairy tale characters tend, of course, to be all good or all bad, rather than a mixture of good and bad.)

Ask the groups to share the differences they found between the assigned story characters and the fairy tale characters.

Divide students into three groups: plot, setting, characters. Ask them to work in paris or trios with someone else in their group to modify the assigned story to make it into a fairy tale (5-10 minutes). Take input from wach group to outline the modified story on the board.

Ask students to do new two-character diagrams (for homework) of the modified characters and be able to defend their choice of characteristics to exaggerate as totally good or bad.

Evaluation: Give students a copy of a familiar fairy tale and ask them to (re) write a dialogue between the contrasting characters as if they were real people with complex personalities.

For example, if the right hand character comes across to the left hand one with anger does he/she respond with anger also?

As they describe the interaction ask them to add information they are getting about their character from his/her behavior in the interaction. (This information may be written on the two-character diagram within the silhouette).

Have students who diagrammed the same character meet as a group to discuss the following questions:

1. What did you learn about your character from his/her interaction with other characters?

2. Did different people in the group learn different things based on the kind of interaction and relationships they examined?

3. From what kind of interaction do you think you learn the most about a character?

4. Using paper cutouts of characters, show what you learned about your character from his/her relationship with each of the other characters.

Literature, Charaterization

Objective 4: "Evaluate the credibility of the characterization."

Objective 4a: Propose several possible alternatives for a character in any given situation.

Activity: Read Frost's "The Road Not Taken" aloud. Furnish each group with a copy of the poem.

Ask students to discuss in small groups the following questions:

1. What decision did the character have to make?
2. On what did he base his decision?
3. Was it possible for him to take the other road? Why or why not?
4. What alternatives did he have besides taking one of the two roads?

Lead a discussion of the last question, encouraging students to generate as many alternatives as possible. There are many plausible alternatives because so little information is given about the character.

Read (or have the students read) a story in which the character must make a decision at a critical point in the story. Stop reading just before the decision is revealed. Ask small groups to brainstorm for all the possible decisions the character could make at this time. Have each group evaluate their lists in terms of what is known about the character.

Have each group select a decision to elaborate on. Encourage groups to choose unusual, yet credible decisions. Have each group briefly outline (on chart paper) the ending of the story.

Post the outlines.

Ask all the students to review each outline and then rank them first in terms of their credibility for the character and then in terms of how much they like each ending. Tally the votes for each.

Discuss credibility and author's license.

Ask:

"Is it possible to have a less than credible character and an enjoyable story anyway?"
"What effect on character credibility does an unusual decision have?"

You may wish to have students read several stories with critical decision making points and have them propose alternative decisions for the characters.

Evaluation: Ask students to identify the critical decision of a character in a story and explain why (or why not) it was a credible decision for that character in the following format. The characteristics on actions chosen should lead (undeniably) to the character's decision. That is, the decision made was the only possible one in light of the character's personality and behavior.

Characteristic or action of character

Characteristic or action of character

Characteristic or action of character

Characteristic or action of character

---

Therefore, (the character) made (the decision)

Objective 4b: Create a larger-than-life character who is nevertheless credible.

Activity: Provide students with a Superman cartoon strip, a story about Paul Bunyan and a James Bond episode descriptions.

Ask students to compare these three characters in terms of specific criteria which they choose. They may use a chart to record their data.

| Criteria: | Superman | Paul Bunyan | James Bond | Conclusion |
|---|---|---|---|---|
| Special Powers | | | | |
| | | | | |

One thing all these characters have in common is credibility. Ask:

"How can these characters be obviously unreal and yet be real enough to allow us to identify with them?"

Ask each group to develop a profile of the believable superhero They might wish to use a "Want Ad" format.

Wanted: Believable Superhero. Must be _____, _____, _____, and _____. No_____ need apply.

Share superhero profiles. Ask each student to contribute to the creation of a superhero for his/her group. Each student should take one characteristic of the believable superhero and elaborate upon it in a paragraph. When everyone has written a paragraph on one characteristic of a believable superhero, the group should organize them into a total picture of the superhero, adding elements as needed, and finally giving her/him a name.

Evaluation: Given a description/clip of a handicapped character (e.g., the Hunchback of Notre Dame or the Elephant Man), ask students to identify the elements of the character that make him/her credible.

Unit of Evaluation of Individual Students

Ask each student to complete one of the following assignments:

1. Create a character and share that character with the class in some way (written description, poem, scenario, etc.). Briefly outline the type of literature, setting, and plot your character might got into.

2. Become a character! Write your autobiography through developing yourself as a character. You may retain your setting, plot, etc. or modify it to suit your fantasies.

3. Select a character you particularly enjoy and create a story in which he or she does something totally unexpected ("out character") and yet believable.

4. Write a "Characterization Made Easy" pamphlet in which you give "handy, helpful hints" for would be writers. Discuss your ideas for content with your teacher before proceeding.

Culminating Activity

Ask each student to form groups of three or four.

Ask each group to describe a problem situation in 100 words or less. Give each group a general guideline for tone: exciting, frightening, exhilirating, funny, gloomy, gross, etc.

Require them to complete the task in 10-15 minutes.

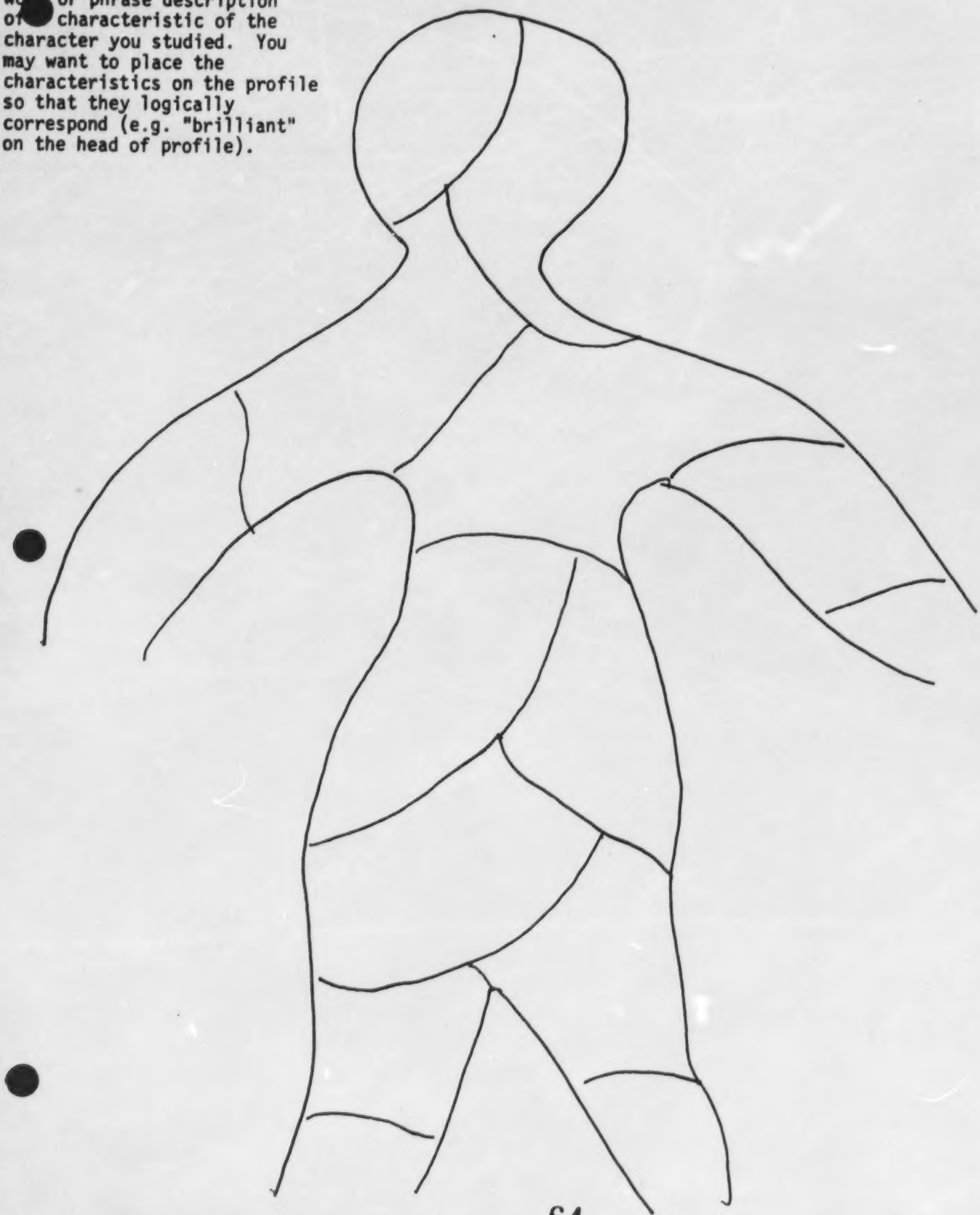
You may wish to provide this sample:

> It was a dark and cold October night; the kind they make horror films about. There were even the usual scary noises about the old house on the point. The wind blew frightfully, the moon darted in and out of the dense clouds and an occassional large dark flying creature swooped down from above. But in spite of all this, or maybe because of it, the job had to be done. Promises had been made and there were those who would check.

Collect the scenarios and read one of them aloud. Ask each group to complete the "picture" by adding a description of a character who would be believable in that setting. Ask one person from each group to read the character description. The other groups may ask questions. (Have a different member of the group share each time a new scenario is presented.) Discuss how the alternative characters were alike or different and why each alternative could (or could not) emanate from the given scenario.

Character: _____

Directions: Write a single word or phrase description of a characteristic of the character you studied. You may want to place the characteristics on the profile so that they logically correspond (e.g. "brilliant" on the head of profile).



Handout 2:
Objective 3a

Character: _____

Likes:

Other Characters:

Dislikes:

Habits:

Temperament:

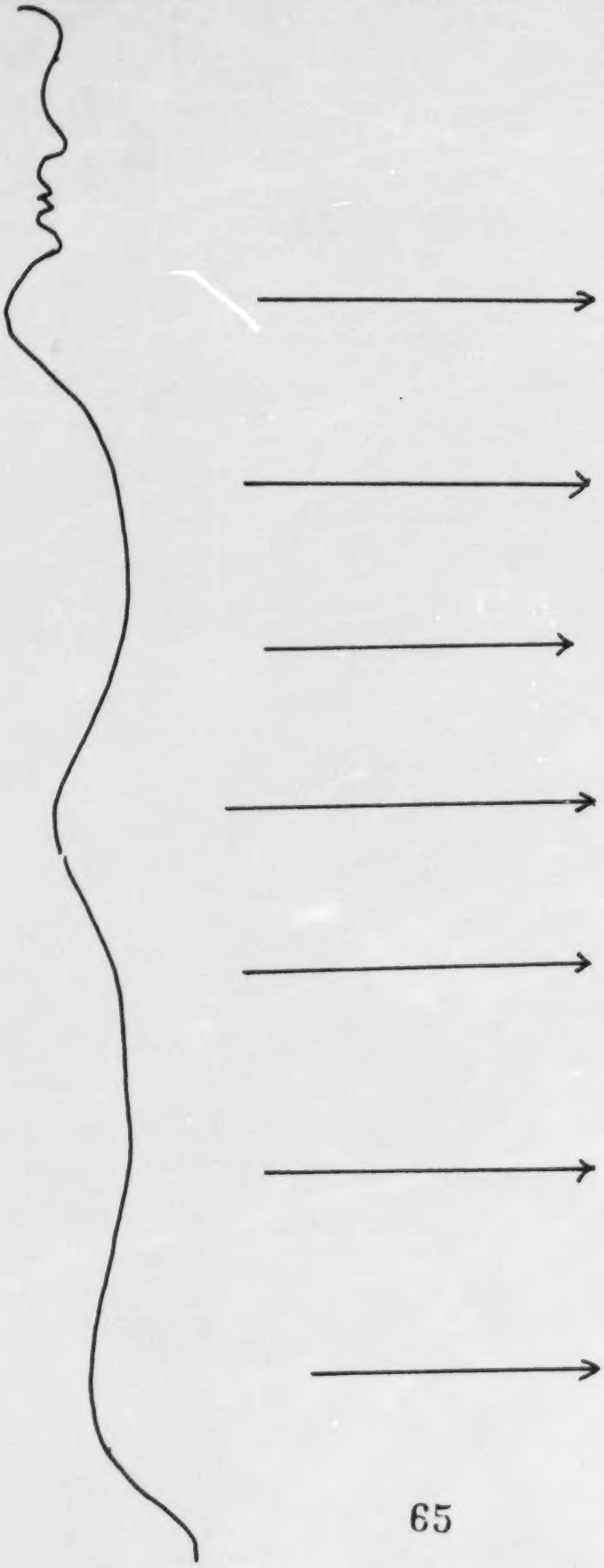
Strengths:

Weaknesses:

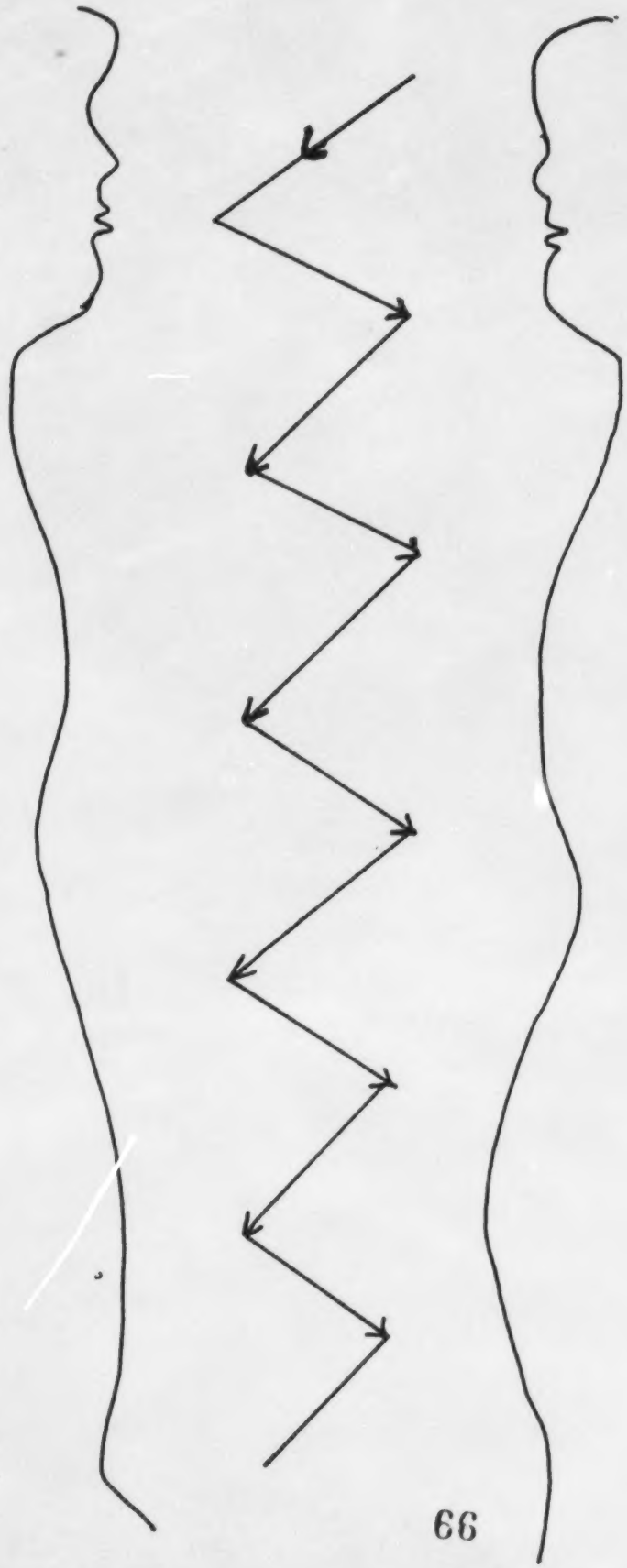
Attitude:

Beliefs:

Thoughts:



Character: _____ Interaction Character: _____



# The "Real" Thing

An Algebra Unit on the Real Number System

# The "Real" Thing

## An Algebra Unit on the Real Number System

### Rationale:

Algebra is the mathematics course which builds upon the student's knowledge of arithmetical processes. It is the basic language and thought process of higher mathematics. The student learns a systematic approach to operating with unknowns. He/she learns to quantify the environment for the purpose of describing relationships, drawing conclusions and making predictions which cannot be made using qualitative concepts alone.

All algebraic techniques are based on a classification and naming of quantity concepts called the Real Number System. The subsets of this system represent the historical development of the use of quantity as well as exemplifying the rigorous approach to definition which characterizes Algebra. It is essential, therefore, that students have complete mastery of not only the definitions of the Real Number System and its subsets, but of the approach they represent.

### Terminal Objectives:

The student will be able to predict within which subsets of the Real Number System a given problem could operate and provide support for the answer.

The student will be able to describe/define an operation in terms of the subsets of the Real Number System.

### Culminating Activity:

The student will describe a new field of two operations, one given (star), and one invented.

### Management:

This unit is designed to be accomplished in two weeks of 45 minute classes (and homework) if the basic format is followed. The overall approach is of proof of various propositions with the use of the information given. Activities preceded by an asterisk provide further opportunities for higher level thinking for the class or a few precocious students within the class. It is suggested, therefore, that the teacher read through all the activities for a system before teaching.

### Activities:

I. System: Binary Operations

A. Thinking Skill: Analysis of Relationships

1. Provide students with the handout on FIELD.

2. Ask students to research the term "binary operations". They might use the mathematics text, the dictionary, or an encyclopedia of math to find a definition and explanation of its use.

3. Divide class into teams of 3-5 students and ask them to answer the following question:

   "Why is it necessary to use parentheses in many of the properties of a Field in order to be consistent with the definition of "binary operation"?

4. Ask a spokesperson for each team to share their answer to the question. Discuss the various answers. Guide the class in achieving a consensus.

B. Thinking Skill: Hypothesizing

1. Given a definition of "binary operation", students will give an example of a "non-binary operation" or explain why they cannot.

2. "It is necessary to use parentheses in many of the properties of a Field in order to be consistent with the definition of binary operations and because mental processing seems to occur on two elements at a time." Design an experiment to test the "binary thinkers" hypothesis.

II. System: Properties of a Field

A. Thinking Skill: Analysis of Elements

1. Divide class into teams of 2 and 3 and ask them to describe (in words) each of the properties of a Field.

2. Post team's differences by property and provide students with the appropriate labels (commutative, associative, etc.).

3. Ask students to write a definition of each property.

B. 1. Ask students to deine each of the following sets of numbers:

| | | |
|---|---|---|
| Naturals | Integers | Irrationals |
| Whole | Rationals | Reals |

*2. In teams of 2-3, ask students to devise a mneumonic (memory strategy) for remembering the definition (and list of elements) of each seto of numbers.

C. 1. In teams of 4-5, ask students to determine which of the sets of numbers are Fields. Each group should submit a decision (Field or not) and a counter example for each property of those sets which have been disqualified as sets.

2. Ask groups to share (and further defend, if necessary) their conclusions.

*D. Thinking : Summarizing

1. Divide the class into hetergeneous groups (on the basis of ability). Each team studies together to learn the properties of a Field for a test in a few days. To facilitate this group effort, one member from each group becomes an expert in one of the properties by attending a teacher-directed group or studying an information packet. The original teams then reform for studying. The idea is to encourage cooperative behavior among students of different ability levels.

2. Individuals are scored relative to a group of their fellow students who are of the same ability, so a student who does the best out of the five lowest students in the class gets five points for his/her team, whereas a student who does the worst out of the top five students gets one point for his team. Students know only that they are competing against students of similar ability, not who those students are. This scoring procedure equalizes the contributions of different level students to the overall success of the team.

3. Teams should be used and maintained for 4 to 8 weeks to allow students to develop working relationships with members of their own teams and to establish competition among the teams.

*E. Thinking Skill: Summarizing

1. Given the definitions of the six sets of numbers (natural, whole, integers, rational, irrational, and real) students will represent their relationships in a diagram. (If students are unclear about what to do, a discussion or display of diagrams of different kinds might be helpful: flow charts, concentric circles, pyramids).

2. Students may then place exemplary elements on their diagrams to indicate what systems the element is within. This also serves as a check on the accuracy and efficiency of their diagrams. Ideally, an element should have to be written only once to show its relationship to all the systems. As they compare the ease with which they can place specific elements this will become apparent.

*F. Thinking Skills: Argumentation

1. Introduce the forms of syllogisms: premises and a conclusion of varying degrees of strength depending on the premises and their relationship.

2. Ask students to decide whether or not each set of numbers (natural, whole, real, etc.) is a field. Have them state their decision as a conclusion and support it with information about Fields, and about the set of numbers written as premises.

3. Counterexamples may be used to show that a specific property of a Field is not satisfied for a given set.

4. Post arguments and ask each student to evaluate at least two arguments in terms of form and cohesiveness.

III. System: Fields

A. Thinking Skill: Evaluation, Objective
The following questions are to be answered by each student:

1. Which of the sets of numbers are closed substraction?

2. Which of the sets of numbers are closed under division? (This should lead to a discussion of division by zero.)

3. Which of the sets of numbers are closed under both subtraction and division?

4. For each of the following sets, tell which properties of a Field are true and which are false. List the sets in order from the one that comes closest to being a Field (i.e. the one that satisfies the greatest number of Field properties) to the one that least like a Field.

Set Q: Positive Integers  Set S: Non-negative Rationals

Set T: Non-negative Integers  Set M: Positive Rationals

B. Thinking Skill: Hypothesizing

1. Ask "of what value is it to know that a set of numbers is 'closed' under an operation?"

2. Have students explore the implications and possibilities of the concept of FIELD by completing the following sentences.

Implications

Knowing that _____is closed under _____ allows us to _____.

Knowing that _____is closed under _____ makes it easy to _____.

Possibilities

If we did not know that _____ was closed under _____, it would be impossible to _____ .

If we did not know that _____ was closed under _____, it would be difficult to _____.

3. Have groups come up with more than one set of responses for each sentence.

NOTE: This is the logical analysis technique which focuses the student's attention on the necessary and sufficent role one system may play within a larger one.

*C. Thinking Skill: Analysis of Relationships

1. Given the set:

positive, non-negative, negative, non-positive

and the set:

wholes, naturals, rationals, irrationals, integers, reals

have students list all the possible two-term combinations such as positive-rationals and non-negative integers.

2. Ask students to then determine which properties of a FIELD apply to each.

3. Ask students to rank order the two-term combinations from "most like a FIELD to " least like a FIELD.

*D. Thinking Skill: Synthesis, Brainstorming

1. In teams of 4-5, ask students to brainstorm ideas for why the notion of FIELD is useful or how it might be useful in another context. ("50 Ways to Use a FIELD").

2. Ask students to group and label their idea groups and to evaluate the ideas they brainstorm.

3. Some students might wish to follow up on the use of the notion of FIELD or make a proposal to the appropriate group on its use. A tongue-in-check essay might be a product for a school newspaper.

IV. System: Relationship of Real Number System to FIELD

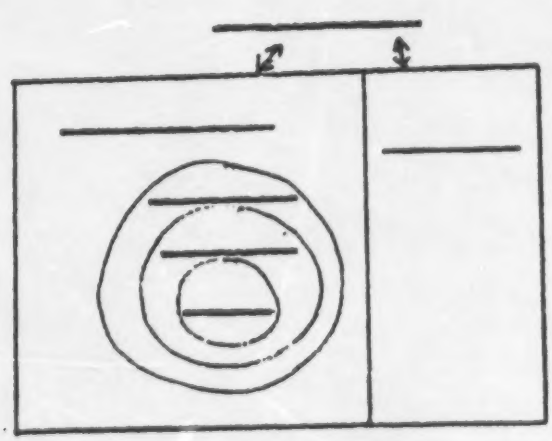
A. Thinking Skill: Summarizing

1. In order to summarize and categorize the work done to this point, each student is asked to complete the following two tables:

a. Complete the following table by writing "yes" or "no" in each box.

| | CLOSED ADDITION | CLOSED SUBTRACTION | CLOSED MULTIPLICATION | CLOSED DIVISION | IDENTITY EL. ADDITION | IDENTITY EL. MULTIPLICATION | ADDITIVE INVERSES | MULTIPLICATIVE INVERSES |
|---|---|---|---|---|---|---|---|---|
| NATURAL NUMBERS | | | | | | | | |
| WHOLE NUMBERS | | | | | | | | |
| INTEGERS | | | | | | | | |
| RATIONAL | | | | | | | | |
| IRRAT'L | | | | | | | | |
| REALS | | | | | | | | |

b. Complete the following diagram of the Real Number System by placing the appropriate name of a set of numbers on each line. The finished diagram should demonstrate the various subset (or disjoint) relationships among the sets of numbers:



B. Thinking Skill: Summarizing

1. Ask students to return to the diagrammatic representation of the six sets of numbers and add (or completely redo to include) the following information:

a. Sets closed under:

addition
subtraction
multiplication
division

b. Sets having:

identify element, addition
identify element, multiplication
additive inverses
multiplication inverses

Cluminating Activity:

I. System: Abstract Systems

A. Thinking Skill: Analysis of systems

1. Provide students with the handout on Group, Addiplication, and Operation Star.

2. In teams of 2-3, students are asked to answer the following questions and support their responses. Those students who were introducted to syllogisms should use that format.

a. Is the set of Naural Numbers a Group under addiplication?

b. Is the set of Integers a Commutative Group under addiplication?

c. Is the set (1,0,-1,-2,-3,...) a Group under addiplication?

B. Thinking Skill: Analysis of Systems

1. Have students refer to the definition of Operation Star.

2. Ask "Is set H a Commutative Group under Operation Star?

3. Students should support their answers.

C. Thinking Skill: Analysis of Systems

1. Challenge students to describe a new FIELD defined by Operation Star and another operation and another operation of their own invention.

"Using set H as described above, and replacing in the definition of a FIELD the operation of addition with operation Star, define a second operation to replace multiplication so that set H will be a FIELD using both operation Star and your newly defined operation."

# FIELDS

A set F is called a FIELD if there are two binary operations (denoted by + and . and called addition and multiplication) such that each of the following statements is true:

A1. For any two elements a and b in set F, the result of a + b is a unique element c where c is also an element in set F.

A2. For any triple of elements of F:

$(a + b) + C = a + (b + c)$

A3. There exists a unique element of F, called zero, such that for every element a of F:

$a + 0 = 0 + a = a$

A4. Corresponding to each a in F there is a unique element -a in F such that:

$a + (-a) = (-a) + a = 0$

A5. For every pair of elements of F:

$a + b + b + a$

M1. For any two elements a and b in set F, the result of a b is a unique element c where c is also an element in set F.

M2. For any triple of elements of F:

$(a \cdot b) \cdot c = a \cdot (b \cdot c)$

M3. There exists a unique element of F, called the unit element and written 1, such that for every element a of F:

$a \cdot 1 = 1 \cdot a = a$

M4. Corresponding to each a of F (except zero) there is a unique element 1/a in F such that:

$a \cdot (1/a) = (1/a) \cdot a = 1$

M5. For every pair of elements of F:

$a \cdot b = b \cdot a$

For every triple of elements of F:

$a ( b + c) = (a \cdot b) + (a \cdot c)$

## GROUP

A set G is called a GROUP under a given operation if the following four properties are true:

G1. Set G is closed under the given operation.

G2. The associative property holds for the given operation using elements from set G.

G3. There is an identity element for the given operation found in set G.

G4. For each element in set G there exists also in set G that elements inverse for the given operation.

Furthermore, set G is called a COMMUTATIVE GROUP under the given operation if in addition to the first four properties, the following property holds true as well:

G5. The commutative property holds for the given operation using elements from set G.

## Addiplication

Addiplication is defined as follows (the symbol @ will be used for addiplication):

$$a \,@\, b = (a + b) + (a\ b)$$

## Operation Star

Operation Star (the symbol for operation Star is *) is defined by the following table:

$$H = \{a, b, c, d\}$$

| * | a | b | c | d |
|---|---|---|---|---|
| a | b | a | d | c |
| b | a | b | c | d |
| c | d | c | b | a |
| d | c | d | a | b |

# "HOT STUFF"

A Science Unit on Heat

## Introduction

Heat is a fundamental concept in science. Its effects permeate all area of science to some extent. It is currently highly relevant due to the energy problem.

These activities represent a variety of approaches. Some are appropriate as introductory activities and these may be used with the whole group. Later activities involve small groups in extending the students' knowledge of the topic. The final activities focus on problem-solving and may be completed by only a few students.

A list of concepts and their definitions is included in the unit.

## Rationale

Topics commonly taught, such as heat, are often presented to students in a lecture format. Such an approach usually involves repetition and little if any processing of information.

Familiar topics are often approached in such a rote fashion because they are so familiar. It is difficult to approach them as new systems to be analyzed because they are so common. This unit is designed to make the familiar concept of heat, strange enough so that gifted students can analyze it and perhaps go beyond it in unique and useful ways.

Amory Lovins, the so-called "energy prodigy," has achieved recognition because he has looked at the earth's energy resources in a new way. As our planet faces the problems of an increasing population and decreasing energy supply, it becomes essential to reorganize "old" knowledge. Gifted students have the potential to do this if they are given such opportunities early in life.

The activities which follow were designed to teach problem-solving skills, as well as promoting an exploratory attitude in science.

Unit Concepts:

1. Heat - The motion of particles. The greater this motion the greater the heat.

2. Conduction - One of three ways heat can be transferred from one object to another. Fast moving particles influence the neighboring particles to vibrate more rapidly.

3. Convection - Major method of heat transference in liquids and gases. Rapidly moving particles occupy more volume than cooler slower moving particles. The net result is a lower density. This lower density material rises while the cooler, more dense material sinks. These circular currents are called convection currents.

4. Radiation - The third method of heat transference. The engery is carried via infrared radiation. This radiation strikes objects causing the particles to move faster. All our heat from the sun is transferred in this way. Microwave cooking is similar.

5. Expansion/Contraction Due to Heat - As particles are heated the increased motion requires them to occupy more space and the object expands. It is important to realize that the particles themselves do not expand. Contraction would be just the opposite of heating and expansion.

6. Bimetallic Strip - The bimetallic strip as the name indicates is made of two different metals. On one face of the strip is a metal such as copper that has a high coefficient of expansion. The other face is composed of a metal with a lower coefficient of expansion. As the strip is heated, the copper expands more rapidly than the other metal. This uneven expansion causes the strip to bend.

7. Calorie - A unit of heat measurement. The heat necessary to raise one gram of water one degree celsius.

8. Heat of Fusion - The heat (calories) needed to change one gram of a solid into a liquid. For water the heat of fusion is 80 calories.

9. Heat of Vaporization - The heat (calories) needed to change one gram of liquid into a gas. For water the heat of fusion is 540 calories.

Unit Concepts (continued)

10. Specific Heat - The heat (calories) need to raise one gram of substance one degree celsuis. Water has a specific heat of only .5 . Therefore the temperature of a certain mass of ice will change more rapidly than the same mass of water.

Topic: Uses of Heat

Thinking Skill: Analysis, Elements

Activity:

1. Divide the class into teams. Each team should list as many uses for heat or effects heat has as possible. Each element is listed on a separate 3 x 5 card.

2. Compare and improve listings as a total class.

Topic: Types of Heat

Thinking Skill: Analysis, Grouping Elements

Activity:

1. Do activity analysis of elements - heat.

2. In teams students are asked to classify the elements of the system and label each class. (classes might be "cooking food", "staying warm", "for destruction", "for industry").

3. Compare the classes formed by teams.

4. Have each team defend the approach used to classify the elements.

Topic: Types of Heat

Thinking Skill: Analysis of Relationships

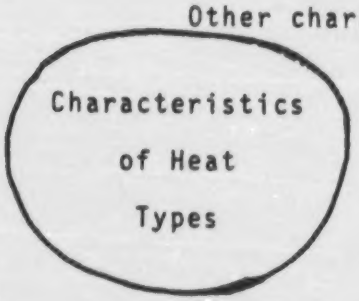
Activity:

1. In small teams, students are asked to identify the possible relationships among the labeled classes of elements. Teams may use one of the following modes for their relationships:

   Example: Analogies

   heat for cooking: heat for healing:: chopping down trees: planting a new forest

   Venn diagrams - List of common/uncommon characteristics. (See introduction on thinking skills)




2. Compare relationships described by different teams.

3. Each team defend a relationship developed by another team.

Topic: Types of Heat

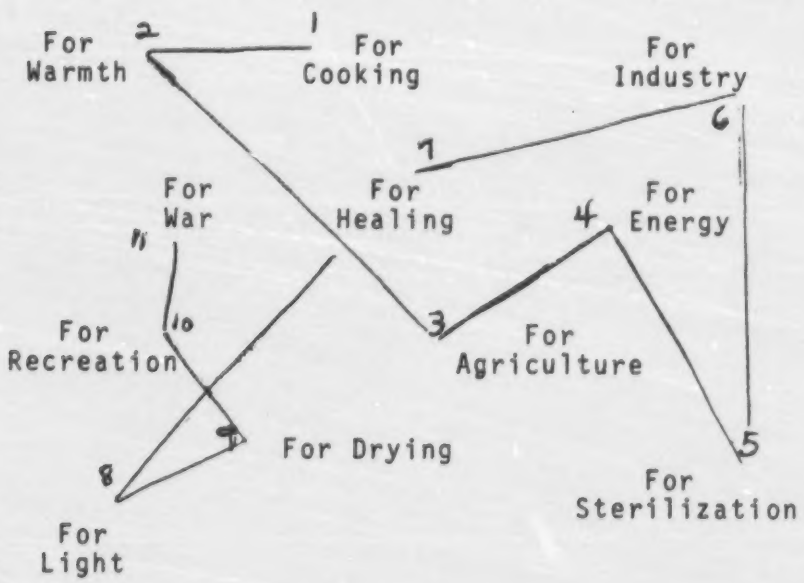
Thinking Skill: Analysis, Organization

Activity:

1. Each team should take their classes developed for the uses of heat, orgainze the classes and relationships into a total system to show the priorities among them.

2. Have each team defend and discuss their organization.

Example: Important For Me To Live



Topic: Heat Effects

Thinking Skill: Synthesis, Hypothesizing

Activity:

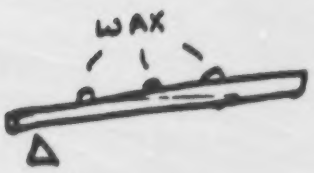
1. Demonstrate the first experiment shown below:

a.

Heat an empty flask that has a balloon stretched over the mouth.

b.

Place two crystals of $KMnO_4$ in a large beaker of water as shown. Heat the area under one of the crystals.

c. 


Heat the end of a metal rod that has three wax drops on it.

d.

Do the ball and ring experiment. Heat the ring to let the ball pass through or cool the ball to pass through.

e.

Heat a bimetallic strip.



Δ = heat

2. Do the second experiment shown.

   After this experiment, students are asked to give a logical explanation of how each piece of information fits into a total picture.

3. Continue doing experiments allowing time for students to revise or retain their hypotheses

4. Have students explain their hypotheses to the class.

5. Pose various situations to the class, have them explain how their hypotheses would accommodate these situations.

   Example:

   Hot air balloons
   Water boils
   Bimetallic strip
   Thermometer

Topic: Definition of Heat

Thinking Skill: Synthesis, Argumentation

Activity:

1. Have students choose one of the hypotheses (or generate their own) listed below.

2. Students will organize data to develop an argument(s) which supports (or invalidates) the hypotheses they have chosen.

3. Teacher should assign students to hypotheses so that each is either defended or rejected.

Hypotheses:

1. Heat is a mysterious substance.

2. Heat can be explained by the action of gremlins.

3. Heat is the motion of particles.

4. Heat is one kind substance, cold is another.

Topic: Applying the Model - " Heat is the Motion of Particles"

Thinking Skill: Analysis, Relationships

Activity:

1. Students are able to rephrase the terms radiation, convection, and conduction (through reading, filmstrip, etc.).

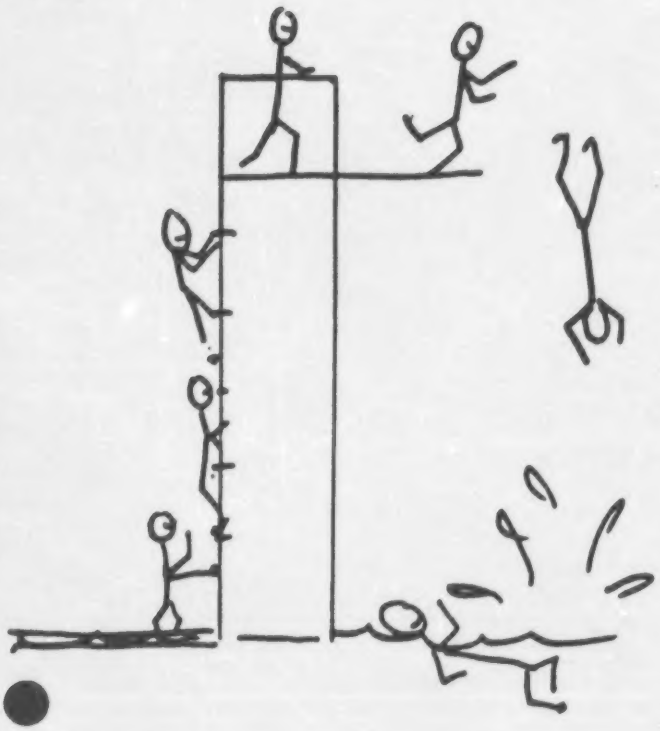
2. Have students create analogies for heat and these three ideas.

   Example: heat: radiation:: _____:_____

3. Students also create analogies for heat and expansion, contraction, evaporation, condensation, freezing, melting, etc.

4. Students may use Lucas' Substitute word method for remembering the terms in #3, their definition, and their relationship to heat. For example, "contraction" can become con-tractor (a big black tractor with gangster hat and shifty eyes) in the sunlight (for heat energy) going over various objects which become contracted. (See Loraine and Lucas, The Memory Book, N. Y.; Stein and Day, 1974.

5. Student teams are each given one of the pictures on page 12. They are to "decode" the picture in terms of what they know about heat. They create another picture which shows their "decoded" message to be shared with the other teams. Then each team is given all four pictures and asked to organize them all into a system.



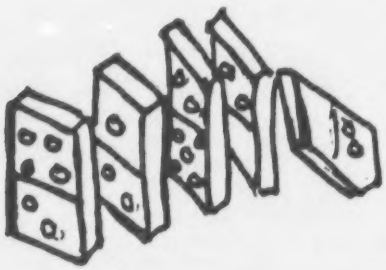
SAILPLANE

Topic: Heat Transfer

Thinking Skill: Synthesis, Summarizing

Activity:

1. Present students with the following:



2. Ask students to make one statement about the information that applies to these pictures and no other.

Topic: Heat Transfer, Conduction, Convection, Radiation

Thinking Skill: Analysis, Classifying

Activity:

1. Students are given the following list to group:

| | |
|---|---|
| Sun tanning | Microwave cooking |
| hot air ballooning | frying a egg |
| taking a sauna | burning a finger on |
| warming hands over a campfire | a hot kettle |

2. Students share the groupings they have made. If students did not discover the concepts of conduction, convection, and radiation, have them eliminate their present criteria and regroup until this is achieved, or present them with those groupings and ask them to explain how they would be possible.

3. Brainstorm additional activities that involve the three concepts (i. e. add to the groups).

Topic: Living in an underground house

Thinking Skill: Evaluation, Subjective

Activity:

1. Write a statement on how you would feel about living in an underground house.

2. Have class discuss their feelings.

3. Make list of good & bad aspects.

4. Present pictures and brief descriptions of underground houses to students.

5. Have students repeat their evaluations.

6. Ask students to explain the similarities or differences in their evaluations. Discuss.

7. Apply your knowledge of conduction, convection and radiation to describe heat in an underground structure.

Topic: Heat Sources

Thinking Skill: Synthesis, Originality

Activity:

1. Inform students that the ovens in the cafeteria are obsolete. A new method needs to be invented so that food could be cooked without using the traditional methods. People are hungry on cloudy days too. They are to create a new thing that will cook their foods. It must make sense scientifically. Students may work in groups or individually. They may use brainstorming, take data gathering trips, use morphological analysis, etc.

2. Have students present their invention to the class including a list of materials, diagram (or picture) and a description of the process from beginning to end. The best proposal should be sent to the Food Service Director and the building principal.

Topic: Heat Sources

Thinking Skill: Synthesis, Flexibility

Activity:

1. Problem: heating a test tube

2. Objects: milk carton, clock, ping pong ball, potato chip

3. Directions: Students may work in groups of three to five.

   Ask students: "How could you use any of these items to heat a test tube? Write down any ideas you think of, no matter how crazy or impractical they seem. After you can't think of any more ideas, go back over your list and evaluate and elaborate on the ideas. Be prepared to present your best idea."

Topic: Heat Dissipation

Thinking Skill: Synthesis, Flexibility

Activity:

1. Problem: Cooling a classroom on a hot day.

2. Directions: Forced Relationships

   Provide a catalog for each student. Allow them to select any page (at random) and use something on that page to create a solution.

3. Evaluate the ideas generate and make advertisements for the best ideas for the school paper.

Topic: Conservation

Thinking Skill: Synthesis, Flexibility

Activity:

1. Problem: Heat in the motion of particles, and the loss of that motion means the loss of heat which costs money.

2. Objects:

   Windows
   Walls
   Cement Floor
   Flue
   Siding
   Insulation

3. Directions: Students should freely associate the objects with the problem to create solutions. Evaluation is held off until all possible relationships have been generated. Then solutions are examined and elaborated on.

Topic: Heat & Conservation

Thinking Skill: Synthesis, Flexibility

Activity:

Heat is the motion of particles so to conserve heat we must try to keep these particles moving without forcing them to continue moving by adding heat. Traditionally insulation has been used.

Create new ways of keeping the particles moving by considering similar situations in nature (Direct analogies, Synectics). Ask, "What in nature continues producing without adding back what it produces?" For example, mushrooms provide a tasty food but grow from waste materials, or stone crabs in Florida give up their claws for food for humans and then generate new ones.

Brainstorm for similar situations until no more ideas are forthcoming. Evaluate each analogy to determine if any of the ideas generated by considering similar situations are applicable to the problem of heat conservation.

Topics: Thermodynamics
Calories
Heat of Fusion
Heat of Vaporization
Specific Heat

Thinking Skill: Synthesis, Originality

After the students can define the concepts listed above, have them complete one of the activities below:

a. Create a story where these things happen to people.

b. Do a skit where these are characters or characteristics of the characters.

Example:

Title: The Fertile Triangle

Characters: Willy Water, Wally Water, Wanda Water

Setting: Hometown, U.S.A.

Story:

Wally Water is all gushy about Wanda Water. He decides to play it cool and water at the well. Soon he sees her in the distance, her form flowing across the countryside. Daming the urge to wave, he quiets the babbling within him. In order to impress her, he stays cool. As she approaches, he glimpses the limpid pools that are her eyes. Because she cares not for him, she casts an icy stare on his surface equivalent to -80 grams per calorie. That was all he needed to freeze him to the very heart. She passed, completely oblivious to the havoc she had wreaked on a once fluid soul, now frozen solid in agony.

Students should continue the story introducing the character, Wally Water. (Heat of Vaporization).

## Student Evaluation on the Unit

Students will integrate all the concepts of the unit into a single product (see unit outline).

Example:

1. Write a story along the "Willy Water" idea.
2. Prepare a demonstration on heat for an elementary school child (without the terminology) and test the child's understanding of the concepts.
3. Make a cartoon series which includes the concepts (i.e. Snoopy versus Heat Fusion).
4. Create a structural diagram (or Venn diagram) of the relationships among concepts.

ASK NOT -

What can you do for your country ...

But -

What our country can do for you!

Kennedy convoluted

A Social Studies Unit on Local and State Government
and Civic Responsibility

## Introduction

This unit was developed for gifted students on the required curriculum topic of Local and State Government and Civic Responsibility for Seventh Grade. Except where a specific management strategy is required, only activity suggestions are presented due to the wide variety of programming alternatives currently in use.

Sources of information are given where the information could not be completely summarized. Other sources, currently in use, could perhaps be substituted or added.

## Rationale

Government and civic responsibility are two topics which easily lend themselves to differentiation for the gifted. Since the origin of civilization, the question of how people can live together in a community in such a way as to better each individual's life, has occupied the greatest minds. Our democracy has been called the greatest and most successful experiment in modern times. Yet even with such accolades, the complexity and vagaries of government have led to a large group of "apathetic Americans."

Perhaps the motivation to participate in government stems from the confidence to operate in the political arena. Perhaps the citzenry has been overwhelmed by the ambiguities of an already complex system. And yet, the challenge presented by such ambiguity is the stuff that gifted minds thrive on. A game as important, and as complex as government and politics will intrigue many bright students if they catch a glimpse of its chaotic reality. Unfortunately our traditional programs have emphasized the dry, lifeless structure of levels, branches and their concomitant responsibilities.

The activities in this unit focus on getting the student involved in analyzing the system known as government from the inside out. For the student who is successful in this, there is the challenge of improving that system.

Topic 8: Local and State Government and Civic Responsibility
N.Y.S. Curriculum Guide, S.S. 7

"Understandings" to be gained in this unit taken directly from
N.Y.S. Curriculum Guide

GOVERNMENT

1. "Government is an organization formed to perform services for people for which they have a common need."

    a. Levels of government.
    b. Relationship of levels.

STATE GOVERNMENT

1. The organization of the N.Y.S. government as well as the U. S. government is described in a written constitution."

    a. Branches
    b. Present constitution

2. "Successive N.Y.S. constitutions have reflected the changing needs and the desires of the people of the state."

    a. Constitution of 1777
    b. Amendment to abolish slavery of 1827
    c. Convention of 1864
    d. Convention of 1894
    e. Convention of 1921

3. "The government of N.Y.S. controls and supervises its public education under a centralized structure which receives its direction from the constitution and laws" of the state."

    a. Board of Regents
    b. Commissioner of Education
    c. State Aid

LOCAL GOVERNMENT

1. The N.Y.S. Government has taken care of the administration of the differing needs of its people in differing areas by providing for local governments."

    a. Counties, Towns, Villages, Cities
    b. Effect of population changes on levels of government

COUNTY GOVERNMENT

1. "County government, which has a dual role in N.Y.S., is also changing to meet the challenge of the new way of life in most parts of New York State - the spread of people and industry from the city to the countryside."

    a. Counties carry out state progrmas locally
    b. Autonomy of County
    c. State and Federal aid to county.

2. "County government, which has tended to remain antiquated, has been encouraged to modernize by the N.Y.S. legislature."

    a. No single executive
    b. Elected administrators
    c. Alternative forms of county government
    d. Existing county governments reluctance to update

TOWN GOVERNMENT

1. "The town, which is a symbol of local initiative since it was the first unit of local government, has varied structures even though there have always been standards imposed upon it by the state."

    a. State Standards
    b. Offical s
    c. Services

VILLAGE GOVERNMENT

1. "The village in many parts of N.Y.S. is gradually losing its purpose and its identity."

    a. Original need for village government
    b. Urban Town

2. "The structure and functions of the village in N.Y.S. overlap with the structures and functions of the town."

    a. Taxes and elections
    b. Construction and maintenance of roads & bridges
    c. Structure of village government as imposed by the State Legislature

CITIES

1. "The creation of cities in N.Y.S. is a power granted to the state legislature with constitutional restrictions."

    a. Limits on taxation, assessment, borrowing
    b. Approval of City Charters
    c. Amendment of 1923 relating to property and government of the city.
    d. Local laws
    e. State suggested structural plans (Weak Mayor Council Plan, Commission Form of Government, Council-Manager Form).

2. "The prime functions of cities, which had origin in periods of greatest growth when the state was still predominantly rural, are no longer exclusively city functions."

    a. Areas of overlap with suburban governments (water supply, sewage disposal, paid fire protection, streets, public parks).
    b. Areas where need exists for closer cooperation. (air pollution, sources of water, police protection, treatment of minorities seeking housing, "open space", sewage disposal, maintaining regional beauty.)
    c. Cooperation across state and national borders (Port of N.Y. Authority, Lake Champlain Bridge Commission, Power Authority of N.Y. & Niagara Falls Bridge Commission, Interstate Commission, on the Delaware River Basin, Tri-State Traffic Commission.)

POLITICAL PARTIES

1. "Political parties are organizations formed by the people for the specific purpose of getting the best possible responsible government."

    a. Major/minor parties
    b. In parties/Out parties

"N.Y.S. Government lays the ground rules under which political parties must operate."

    a. Elections
    b. Becoming an official party
    c. Voter affiliation

POLITICAL PARTIES (continued)

3. "The political party, like the government, has a well-defined structure and definite rules under which it operates."

    a. Structure (Committeemen from election districts, assembly districts, state)
    b. Duties of Committeemen

4. "The citizen's best way of getting the government to respond to his wishes is by joining with other citizens and becoming active and vocal members of a political party."

    a. Registering
    b. Voting
    c. Party Activities

5. "A political party will perform its functions only as well as the interest of the people demands and the quality of its leadership permits." (Response of political parties)

    a. Election of John Jay & George Clinton
    b. DeWitt Clinton's canal and governorship
    c. Developing sense of democracy prompted 1821 constitutional convention.
    d. Tweed Ring resulting from demoralization of Civil War and subsequent lack of interest in political parties.
    e. Better government amendments rejected in 1867 but passed in 1874 and followed by four good governors.
    f. Consumer demand for investigation of oil companies at the beginning of 20th century led to later election of Charles Evans Hughes.
    g. Labor conditions legislation following 1911 Triangle Fire championed by Alfred E. Smith.
    h. Franklin D. Roosevelt's Temporary Emergency Relief of 1930's.
    i. Little New Deal of Herbert Lehman.
    j. Grand jury investigation of N.Y.C. racketeering led by Thomas E. Dewey, later governor and Republican Party revitalizer.
    k. Court reforms and aid to education of Averell Harriman, and Nelson Rockefeller.

6. "Since our government functions through the operation of the two party system it is better for both parties to strive to present reasonable programs and good candidates so that either party has a chance at each election to get control of the government."

POLITICAL PARTIES (continued)

a. "Reasonable" programs, are those favored by large numbers of people at any one time in history. (suffrage, minorities, welfare)
b. Parties differ in speed & manner of implementation, but must attend to the peoples desires. (demise of Federalist and Whig parties.)

CITIZEN RESPONSIBILITIES

1. "In addition to belonging to and working for a political party, a citizen has duties which are outside the realm of the party."

    a. Jury Duty
    b. Public Hearings
    c. Non-partisan committees
    d. Letter-writing
    e. Community service
    f. Testimony in court

Suggested Optional Studies:

1. Weights and measures rules
2. Port of New York Authority
3. District Committeemen in Politics

Generalizations:

1. "Institutions tend to outlive their usefulness."
2. "The people in a democracy can have good government if they want it enough to work for it."
3. "A political party cannot survive by dodging the most burning issue of the time."

## Activities

GOVERNMENT

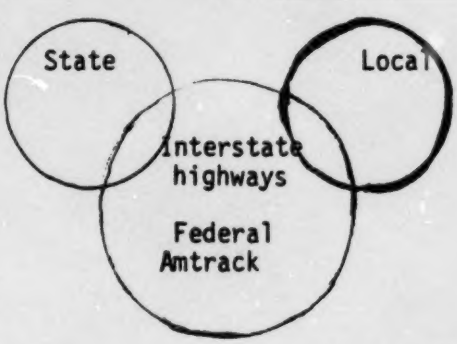
1. A basic assumption in the definition of government is that it responds to the need of the people. List all the ways you think an organization (the government) might perceive the needs of a group (its constituency). Draw a conclusion about whether or not (or to what degree) it is actually possible for the government to perceive the needs of individuals. (Synthesis, Fluency/Flexibility/Originality)

2. The country of Boliva has had 200 revolutions in the past 100 years, yet the lives of the people have been virtually unaffected. Justify the existence of an government which has so little effect on its people. (Analysis of Relationships)

3. Find out if New Yorkers are influenced by State laws. Over 1000 acts were signed into law by the governor this year alone (1981). Interview 10 adults about what actions (if any) of the state this year have affected their lives, and how (Analysis of Relationships)

4. Choose a topic (such as social programs, defense, highways) and show the relationship of the levels of government with circles representing each level and their overlap (or lack of it) representing specific services.

Transportation

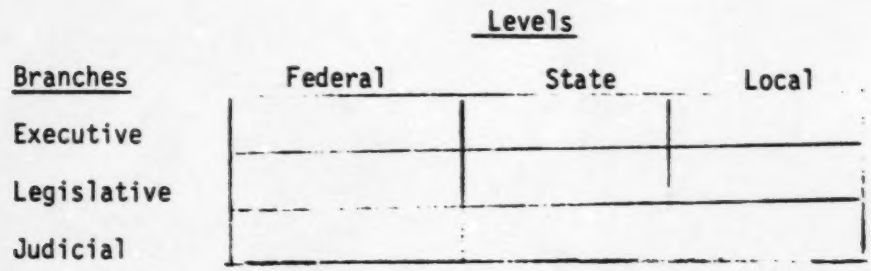



This activity might be done by groups within the class doing different topics and then showing their diagram. (Analysis of Relationships)

Ativities

Government (continued)

5. Make a chart or diagram which shows the levels and branches of government. Take any two of the roles from within the chart to compare or contrast in an analogy. Make at least 6 analogies. (Analysis of Relationships)




Analogy: President is to Senator as pestle is to a mortar.

6. Create a new organization for government based on the elimination of one of the branches. Pretend one branch no longer exists because a great prophet has arrived and said that it is evil. How could the responsibilities of that branch be redistributed and the whole organization of government revised to accomodate the changes? (Synthesis)

STATE GOVERNMENT

1. Identify the assumptions about what is needed and what is good behind the major points of each of the constitutional revisions. (Each small group does one revision.) Hypothesize about the next revision will be, based on the topic of current concern to New Yorkers (gleaned from editorials in newspapers over the past several months). (Synthesis, Summarizing, Hypothesizing)

2. Obtain a copy of the present constitution of N.Y.S. Re-write a part of it which affects seventh graders in language. they can easily understand. Create a "Did You Know?" poster for the halls which would draw attention to the information. (Synthesis, Summarizing)

3. Find out about "Tuition Tax Credits", a proposal made by President Reagan. With a partner, research the major issues pro and con, and role-play a discussion of the issues in the class. (Analysis of Organization)

4. Find out about the Board of Regents; who they are, what they do; how they do it. Set up your own board for a day and simulate action on major issues presented by a teacher, student, and parent. While you on the Board are preparing for your parts, the concerned citizens will also be preparing. (Synthesis, Flexibility)

Activities

Government (continued)

5. Your school library probably has a copy of the district's current budget. Find out what proportion of the budget is State Aid and what the district has to do to get it. Your BOCES may have a State Aid Specialist who can also tell you about the special money grants. Do one of the following:

    a. Predict what would happen to the school's program without State Aid. (Synthesis, Hypothesizing)

    b. Propose an alternative source of funding for State aid. (Synthesis, Originality)

    c. Write a grant in conjunction with a faculty member for special monies. (Analysis, Organization)

LOCAL GOVERNMENTS

1. The original boundaries for jurisdiction of local governments (county, town, village, city) have been blurred by population shifts. After analyzing a specific example (probably locally) of this proposal a reorganization of local government which would more efficiently serve the needs of the people. (Synthesis, Originality)

2. You have just noticed an injured raccoon in your backyard. You live in the suburban area of a large county. Simulate this situation of trying to locate (by telephone) the appropriate authority for dealing with this problem. (To add to the difficulty, ask studnets to do this on a Saturday or Sunday when many agencies are closed.) (Analysis, Organization)

3. Find out who provides services for your neighborhood such as snowplowing, garbage removal, road maintenance, sewage, etc. Begin by listing all the services which are provided. Pretend all these services were cut due to budget problems or strikes and tell how you would get all these things done. (Synthesis, Hypothesizing)

COUNTY GOVERNMENT

1. One of the programs the County administers for the state is Unemployment. Find out how a person is eligible for unemployment benefits and what they must do to receive them on a regular basis. Find out how the county and state governments work together in this area. Report your findings to the group along with your evaluation of the system. (Evaluation, Objective)

Activities

Government (continued)

County Government(continued)

2. When the U.S. Constitution was first rewritten, the federal government has less involvement on the local level than state governments. The widespread corruptions in local governments in the post Civil War period (around the turn of the century) led to more direct intervention in local affairs with funding given directly to local governments. For the last 30-40 years the trend has been for states to assume more responsibility. Is it conceivable that many state administered programs could be handled locally? Find out about the New England Town meeting. If you had to start fresh, what responsibilities would you delegate to local, state and federal governments? (Evaluation, Objective)

3. County governments are considered outdated and inefficient because they often have no single executive and have many elected administrators. Westchester and Nassau counties were given permission to try experimental governments in 1930, find out about these experiments. Find out about your county's government. Make recommendations to update its machinery. (Synthesis, Hypothesizing)

TOWN GOVERNMENT

1. The connection between the needs of local people and their governments has become increasingly remote so that the governments have in some cases launched public relations (PR) campaigns to demonstrate their value. Pretend you have just been appointed PR director for your town. Choose a target audience and "sell the town" to that group. Survey the group before and after your campaign to see if it made a difference in their attitudes. (Evaluation, Objective)

2. What makes a town a town? Collect sayings about towns like "a one horse town", "ghost town", find out where and how they originated or make up a story about their origins which could be true. (Synthesis, Flexibility)

VILLAGE GOVERNMENT

1. When does a village become a city? Can it ever become a town? Write a story about"The Village Who Wanted to Grow Up" in which you anthropomorphize village, town and city. (Synthesis, Originality)

Activities

Government

VILLAGE GOVERNMENT (continued)

2. What is the connotation of village? the denotation? Interview people in different age groups about the definitions of village, town and city. Draw conclusions and represent them with "mind's eye" cartoon drawings of each age group. (Synthesis, Originality)

3. Given a list of the roles and responsibilities of village and town officials, rank them in terms of decision-making power. Since the functions of town and village government overlap, there may be cooperative as well as hierarchical relationships. (Analysis, Organization)

CITIES

1. If you were the State Legislature and had received a huge, almost limitless sum of money as a gift from a wealthy New Yorker, earmarked especially for the creation of a new city in New York State, where would you locate it and why? Present your proposal to your peers using a map of N.Y.S. and convince them (particularly the ones from the region you are proposing) to accept your proposal as the best. (Class may vote on where to locate the new city.) (Evaluation, Objective)

Activities

Government (Continued)

Cities (continued)

2. Compare and contrast two of the forms of city government recommended by the state. Create a fifth alternative based on the disadvantages and weaknesses of the others. (Analysis, Organization)

3. Urban renewal programs have been provided for several years. One of the major reasons the urban environment has decayed is because of the large numbers of middle and upper class people have moved to the suburbs. Is it in the interest of the suburban population for the city to survive? Share your answer and the reasons for it in one of the following ways (or a method of your own invention): (Evaluation)

   a. Write a story about the death of a city and its effect on the suburbs surrounding it.
   b. Simulate a beginning session between an urban and a suburban government in which each needs something the other has.
   c. Support the opposite position you actually hold in a series of illogical, unfounded, ridiculous and yet adamant arguments.

Optional: Read the original Logan's Run

4. Find out about a local issue in which urban and suburban governments are cooperating and how it came about (try interviewing a local offical over the phone for a start). Evaluate the pay off for each group. (Evaluation, Objective)

POLITICAL PARTIES

1. One of the major premises of a democracy is the fostering of alternative viewpoints. The two-party system is often referred to as the backbone of that diversity. In recent years, political observers have charged that the Republican and Democratic parties are different in name only. Analyze the Republican and Democratic platforms from the most recent Presidential contest. Create a third party which has a different mascot (donkey/elephant), and nevertheless, a reasonable position. Can it be done? If so, proceed with it. If not justify the existence of two similar parties. (Synthesis, Orginality)

2. "The citizen's best way of getting the government to respond to his wishes is to join with other citizens and becoming active and vocal members of a political party".

Activities

Government (continued)

Political Parties (continued)

2. (cont'd.) This statement is based on the assumption that there is "strength in numbers". While this may be true the extent of the individual's contribution to democracy through these channels may be reduced to giving money. Since the party seeks your "active" support only in this way, how can you become meaningfully involved. Find out from your local party office and the League of Women Voters how to become politically active without running for office. (Analysis, Organization)

3. Party Committeemen have traditionally been the closest to the people. Find out about Boss Tweed's committeemen and how committeemen operate today. Present a scenario of each. (Analysis, Organization)

4. Collect literature from two political parties. What can you infer about their internal organization based on the products they turn out. Are they different? Similar? What do you think it would take to run a local chapter of one of the parties in terms of budget, personnel, and activities? (Analysis, Organization)

5. Find out what public demand led to the eventual personal success of the following individuals:

| | |
|---|---|
| John Jay | Charles Evans Hughes |
| George Clinton | Alfred E. Smith |
| DeWitt Clinton | Franklin D. Roosevelt |
| Boss Tweed | Herbert Lehman |
| Thomas E. Dewey | Nelson Rockefeller |
| Averell Harriman | |

How does a "Champion of the People" arise? What is the major need or demand of the people today? How would you go a about responding to that need as a state governor? (Synthesis, Hypothesizing)

6. Over the years some parties have died (Federalist, Whig) and others have emerged (socialist). What makes a party a winner or a loser? Write a handbook on "How to Survive as a Political Party" in a humorous vein. (Synthesis, Originality)

7. Pretend you are an observer from another planet (ORK perhaps) at a national convention. Send in a "Report from Mork" on what went on. (Synthesis, Originality)

8. Do a structural diagram of the transfer of people's desires to the federal government through the political parties. Be sure to begin with the individual citizen and include small roles like committeemen. Estimate the time to complete the process. Propose a more efficient method of getting the information. (Hypothesizing)

Activities

Government (continued)

Political Parties (continued)

9. John F. Kennedy once said, "Ask not what your country can do for you but what you can do for your country." If your country demand the following services from you, what services would you expect in return?

   Political party participation:

   Jury duty
   Attendance at public hearings
   Serving on non-partisan special committees
   Letter writing
   Community service
   Testimony in Court
   Obedience of all laws
   Tax-paying

What can you do for your Country?

What can your Country do for you?

Can you balance the scales?

If you can't, what are your alternatives? (Analysis, Organization)

CONCLUSION

1. Choose one generalization to support or refute.(Analysis, Organization)

   Generalizations:

   a. "Institutions tend to outline their usefulness".
   b. "The people in a democracy can have good government if they want it enough to work for it."
   c. "A political party cannot survive by dodging the most burning issue of the time."

2. Choose a special topic to find out more about (for extra credit). (Application)

   Weights and Measure Rules
   Port of N. Y. Authority
   Triangle fire of 1911
   In-parties/Out-parties
   Short Ballot/Long Ballot
   Patronage

## STUDENT EVALUATION ON THE UNIT

Frances Fitzgerald wrote a book called America Revised: History Schoolbooks in the Twentieth Century (Atlantic/Little/Brown, 1980) of which excerpts are attached. She claims that American textbooks have gradually miseducated the people of our democracy. Instead of teaching them (us) to judge for ourselves what will secure or endanger our freedom, we were taught that good citizenship was "a rather small degree of knowledge of, and participation in, public affairs."

Combine what you have learned in this unit with your own personal experience and attitude about democracy to pinpoint at least three major avenues for the individual citizen to safeguard the freedoms she/he enjoys. Write an open letter to the self-governing people of the U. S. on how to preserve the freedom which is gradually being eroded by their lack of involvement.

# TEXTBOOK AMERICA

As J. E. Russell, head of Columbia University Teachers College, put it in 1905: "How can we justify our practice in schooling the masses in precisely the same manner as we do those who are to be their leaders?"

Since there was no way to stop "the masses" from entering high school, the only way to meet the crisis, in short, was to prevent them from learning anything liberating when they got there. Instead, the educational leaders said, the new secondary schools should offer vocational training in particular and something called industrial education in general.

The "new idea" must have been somewhat perplexing to schoolmarms of the old-fashioned sort. The public schools were supposed to train citizens, yet here were the country's leading educators—"we"—insisting they regard their pupils not as future citizens but as future working hinds, whom Charles W. Eliot, president of Harvard, urged teachers to "sort" by their "evident or probable destinies."

The doings of the high and mighty, in Dewey's "realistic" view, were no business of American schoolchildren, who were to share in the public life of America by leading "a socialized life" in the American work force. Instead of political history they were to be given "social studies," which would teach them, among other industrial matters, about the modern division of labor ("how milk is brought to the city") and, in the loftier grades, about the "evolution" of American industry. Given such instruction, Jane Addams noted in her 1902 work *Democracy and Social Ethics*, American children would not only develop a cooperative disposition, but they would find their adult toil "much more exhilarating," realizing, as they did, the useful slot they were filling on the national industrial "team."

To replace political history with Deweyite social studies was the perfect means of meeting the educational requirements of the powerful. In social studies, American youngsters would learn that America was chiefly an industrial system and not a republic at all, that a "good citizen" is a worker who gets up when the alarm clock

In social studies, too, they would learn that the "real" history of America is the "development" of American industry—history without politics in it, which teaches the most corrupt of political lessons, that politics does not matter. Pedagogical wit could scarcely devise a better instrument for ensuring "a rather small degree of knowledge of, and participation in, public affairs."

Local control of the common schools, though waning, had not yet become a sham. To a degree, (All) it could still meet the purpose for which it was originally intended: preventing the "managers of states" from teaching a republic's children that "good citizenship" consists in "a rather small degree of knowledge of, and participation in, public affairs." The usurpation of local control in the years after World War I was to be an essential element in the corrupting of a venerable republic.

From the new textbooks readers learned that democracy meant the right to vote and nothing more, a definition that does not distinguish America's republican institutions from the totalitarian politics of the Soviet Union. Even reduced to a nullity, democracy, to the educational establishment, was still too dangerous to praise too highly. The fear that citizenship might break out haunts the pages of the propaganda textbooks. Instead of lauding democracy, the textbooks found subtle ways to denigrate it. One of the major texts of the era, FitzGerald says, "concludes with an essay extolling the virtues of freedom not for its own sake but merely as the greatest asset in the world struggle."

Whereas "cooperation" had been the dubious deity of the original industrial pedagogy, the new deity enshrined in the propaganda texts was productivity pure and simple. One prominent junior-high-school history text argued, for example, that slavery was not all that bad because it alleviated America's chronic shortage of labor. Whereas Lincoln had said that if slavery were not evil then nothing was evil, this modern school text, still in use ten years ago, taught children that nothing is evil if it enhances production—the common principle of the capitalist, the commissar, and the tyrant.

One group of reformers, known "The New Social Studies Movement," urged the educational establishment to teach sociology instead of history.

A second group of reformers urged the school managers to offer textbooks that were "relevant" to the immediate problems of "disadvantaged" minorities. What these disadvantaged needed, their self-appointed spokesmen said, were history texts that enhanced their ethnic and racial "pride." Since no political history of America could possibly make anyone proud of being scorned, proscribed, betrayed, or enslaved, the new ethnicity, too, won rapid and pious approval. Through a judicious blend of "social-science concepts" and sops to ethnic pride, the educational establishment has found another way to secure "a rather small degree of knowledge of, or participation in, public affairs." It is not really new, however. It is simply the old industrial education dressed up in a new disguise.

History, in the social-scientific "laboratory" of the textbooks, is now the product, FitzGerald says, of "impersonal institutions and faceless social forces," which she regards as more "democratic" than political history—exactly what it is not and can never be. On the other hand, she is dismayed to discover that "there is no known case of anyone's creating a problem for anyone else" in this wonderland of abstractions. It is impossible for anyone to do so. In the new sociologized history texts, no human being has ever enjoyed sufficient power to do anything for good or ill. Famous men, in this "democratic history," are loci of impotence with illustrious names attached. Watergate, in the latest texts, is something that *happened* to Richard Nixon, and history in general is a slew of forces, pressures, and disasters inflicted by fate on the high and the mighty, who appear as hapless men of goodwill. "There are," FitzGerald says, "no human agencies left."

What the *political* history the textbooks reveals is that a powerful few, gaining control of public education, have been depriving the American republic of citizens, and popular government of a people to defend it. And the American history textbook, so innocent-seeming and inconsequential, has